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MEASURING DISPERSED USE AND VISITOR  
PREFERENCES ON THE BUREAU OF LAND  
MANAGEMENT'S NATIONAL RESOURCE LANDS:  
ARKANSAS RIVER STUDY

Arkansas River Study  
Final Report

for project entitled  
Measuring Dispersed Use and Visitor Preferences on the  
Bureau of Land Management's National Resource Lands

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between

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and  
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## I. INTRODUCTION

### Problem

Growing demands for all the uses of the public lands and requirements of the Federal Land Policy and Management Act of 1976 have focused attention on the needs for better ways of inventorying and managing the nation's public lands. Special attention has been focused on obtaining better measures of the volumes and trends in recreation participation, recreation users' preferences, and assessment of the adverse impacts of recreational use on the resource base.

This study of users of the Arkansas River area in Colorado is one part of a long-term and comprehensive joint research effort by the Rocky Mountain Forest and Range Experiment Station (RMS), Colorado State University (CSU), and the Bureau of Land Management (BLM). The research focuses on identifying and quantifying user preferences for specific recreation opportunities in wilderness, backcountry, and other dispersed recreation environments. Similar sampling and analytical techniques are being replicated in each study to provide comparable experience preference information for users engaging in the same recreation activities in different environments.

### Study Objectives

The specific objectives of the study were:

1. To replicate a procedure (developed by Driver and Brown in Colorado) for identifying and quantifying the recreation-related preferences of recreation users in a part of the Arkansas River area administered by the BLM.

2. To measure and quantify recreation participation, using roadside interview data and inductive loop counter information, on BLM public lands along the Arkansas River.

In addition, several sub-objectives developed as the research progressed based on information needs of managers. These other sub-objectives included: (1) to identify selected demographic characteristics of users of the Arkansas River area; (2) to identify management preferences of Arkansas River study area users; and (3) to identify user preferences for specific biophysical, social, and managerial attributes of the recreation environment.

#### Study Area

The Arkansas River originates in the mountains of central Colorado near Leadville and flows southeast through Pueblo before leaving the state east of Lamar. The primary study area was the river corridor within the Arkansas River Canyon between Salida and Parkdale, Colorado, in the Royal Gorge Resource Area of the BLM's Canon City District. The southern and western boundaries of the study area are bordered by the San Isabel National Forest and scattered parcels of private land. The northern boundary has a checkerboard ownership pattern characterized by areas of National Forest, BLM, State, and private administration.

U.S. Highway 50 through the Arkansas River Canyon is one of the major access routes into the central Colorado Rockies, and is heavily traveled during the summer tourist season. In addition to sightseers, this stretch of the Arkansas River attracts fishermen, campers, picnickers, sunbathers, and white-water river runners in kayaks, rafts, and inner tubes. Commercial and private white-water river runners frequent the river daily throughout the summer. The area around the Arkansas River is also used by summer

recreationists for rock hounding, four-wheel driving, motorcycling, and archaeological interests.

Figures 1 and 2 show the study area for the Arkansas River study with the main study area shown in Figure 1. In calculating use statistics and determining distributions and types of recreation use, the area was divided into three zones labeled 1 through 3. The size and location of each zone was determined by local BLM planners and managers with input from the research team. Zone 1 is the Arkansas River Canyon which contains the primary recreation resources of the area. Zones 2 and 3 are located south and north, respectively, of zone 1 and contain large continuous blocks of public land. Traffic-stop interview locations are designated on the maps by a circle surrounding an X with an additional identification letter. Three inductive loop counters were located in the study area near the roadside traffic-stop interview locations.

Three other interview sites were situated outside the main Arkansas River study area. One area was located on the Arkansas River near the Parkdale (P) traffic-stop site at the bridge takeout point for river runners. This area is denoted by a B in Figure 1 with an asterisk nearby. Figure 2 shows the two other off-site sampling (grab sample) areas north of the main study area. These are called Ruby Mountain and Heckla Junction. Further description of these areas and interviewing procedures are discussed in the methods section of this report.

#### Study Population

The target population for this study consisted of all Arkansas River recreationists exiting the study area via the sampled roads during the sampling period. The sampling period for the study was from May 27 through September 3 in 1978.

Figure 1. Arkansas River main study area.

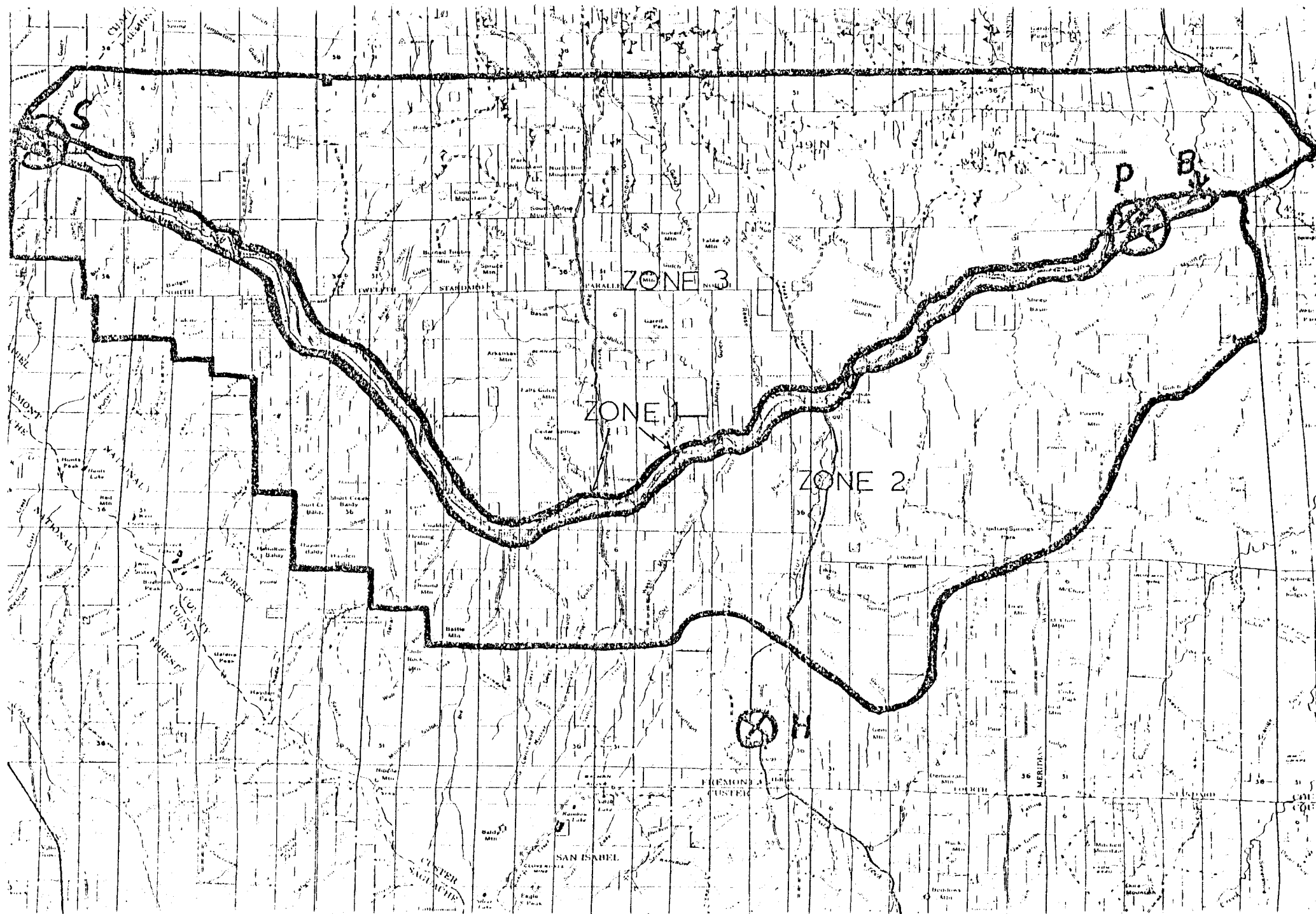
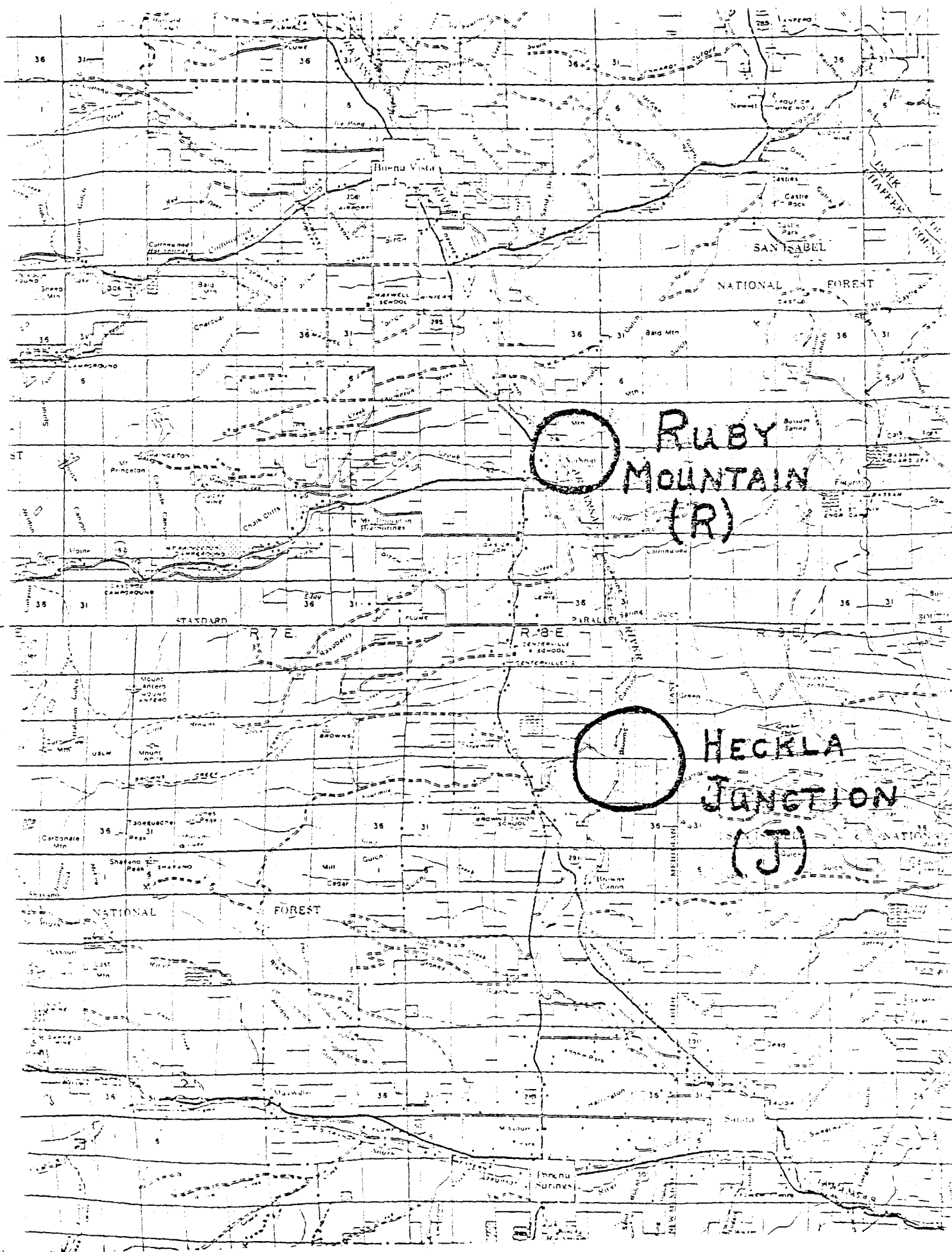


Figure 2. Arkansas River grab sample study areas.





## II. METHODS

There were two data collection modes for this study. A short one-page interview schedule (called the exit interview form) was used to collect recreation use information and names and addresses of users as they left the study area. This form was used to develop a representative list of recreation users to whom questionnaires could be mailed later. The second data collection technique was a mail questionnaire to acquire information on: (1) user preferences for specific recreation activity and experience opportunities; (2) user reactions to possible management actions; (3) user characteristics; and (4) user preferences for specific biophysical, social, and managerial attributes of the recreation environment. Response to all interviewing was voluntary, so no one was obligated to respond to any of the data collection efforts.

### Exit Interview

The primary objective of the exit interview procedure was to collect the names and addresses of a representative sample of Arkansas River recreationists to build a sample frame for the mail questionnaire. This field contact also was used to collect information concerning a user's primary recreation activity, including the location(s) and length of participation in the study area.

### Interviewing Procedures

In contacting recreationists in the Arkansas River study area, an interview technique proven in various recreation environments over the past three years

was used. This technique required contacting recreationists at interview locations along roadsides as they were leaving the study area (Figure 1).

Vehicles were stopped for interviewing only when the interviewer had completed the previous interview, and could safely extract a vehicle from the normal traffic flow. Once a vehicle was stopped, the interviewer proceeded with the interview according to a predetermined set of decision rules specifying the questioning procedure.<sup>1</sup> The interviewer approached and questioned either the driver or a passenger based on a systematic routine for identifying the interviewee, and conducted the interview while the respondent remained in the vehicle. The reason for shifting the interview from driver to a passenger was to obtain a more representative list of area users. The drivers exiting recreation areas tend to be males and heads of households. Because our interests were in the opinions and preferences of other users as well, a practical compromise for obtaining a representative sample was to systematically shift between a driver and a passenger. The interviewee was asked to cooperate in the study and to supply a name and address for follow-up questionnaires. Other passengers in the vehicle were asked for their names and addresses if they resided in a different household than the primary respondent. Any people refusing to participate were thanked for their time and allowed to proceed. The average interview time was approximately two minutes.

#### Sampling Design

The sample design used was a stratified random sample clustered by days. The stratification structure partitioned the target population into homogeneous

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<sup>1</sup>For more details, refer to the study plan dated May, 1978.

groups based on interview station. A second stratification was used to isolate weekend, weekday, and holiday users. The size of sample selected from each stratum was proportional to the population (in this case, vehicles or parties passing by the interview station) of that stratum. Within the strata were clusters comprised of days. Each cluster consisted of a day, with the elements of that cluster defined as the population of recreationists exiting the study area on that day. A sample of clusters was taken from the whole sampling period by selecting specific sampling dates. Once the sample of clusters was selected, the actual interview time period within each cluster represented a subsample of the elements of that cluster.

Because of the physical nature of the main study area, the location of the traffic-stop interview sites, and the primary objectives of the study, the exit interview questionnaire was used to "grab sample" recreation users at specific sites outside the primary study area. In this study, a grab or fortuitous sample consisted of using the exit interview at a designated recreation site to get information from a test group. Sampling using a grab-sample technique might or might not produce a representative sample, but should be considered a convenience or fortuitous sample designed to provide useful information to managers and planners. Areas selected for grab-sampling were not considered part of the main study area, hence use statistics were not calculated for those sites.

The sampling scheme<sup>2</sup> and the use statistics generated from the survey were limited to the extent that the sample sizes selected for each sampling period could not be estimated from population variance estimates for selected

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<sup>2</sup>Refer to the study plan dated May, 1978, for more details about the sampling plan (times and locations).

important variables. Sample sizes with specific variance estimates can be calculated for surveys in areas where previous studies have defined, measured, and produced population variance estimates of the same variables to be quantified in a new study. Since data for specific variables needed to produce variance estimates were not available for the study area selected, sample size estimates determined for this study were primarily a function of vehicular volume estimates from the Colorado Division of Highways, budgetary constraints, the judgments of research personnel, and RMS statisticians advising the study. Further studies will benefit from variance estimates generated ex post facto from this study.

#### Questionnaire

When users were stopped as they were exiting the study area, a short, one-page questionnaire (exit interview form)<sup>3</sup> was used to record their responses. The respondents were first questioned as to whether or not they were primarily on a recreation excursion. Respondents not on a recreation trip were thanked for their time and directed back to the highway. For those recreating in the study area, information was obtained concerning most important recreation activity, location of participation, time spent in the study area zones, and previous visits to the area in the past 12 months, as well as names and addresses, including zip codes. Observations also were made of the type of vehicle and number of people in the party and vehicle. A summary of the results from the exit interview analysis (research objective 2) is in Appendix E.<sup>4</sup>

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<sup>3</sup>Appendix A, Figure A-1.

<sup>4</sup>These results were initially documented as part of the Arkansas River study area Progress Report dated October, 1978.

### Mail Questionnaire

The mail questionnaire phase of the research was the most important for identifying the recreation related preferences of visitors to the Arkansas River study area. The names and addresses obtained from the exit interview constituted the sample frame for distribution of the mail questionnaire.

### Mail Questionnaire Content

The mail questionnaire<sup>5</sup> contained questions designed to provide four broad types of information:

1. Questions designed to identify the types of recreation experiences users desire.
2. Questions designed to measure users' opinions about possible management actions in the area.
3. Questions focusing on the demographic characteristics of the users.
4. Questions measuring user preferences for the biophysical, social, and managerial attributes inherent to the Arkansas River area.

Forty "items" were used as questions to identify and measure user preferences for different recreation experiences. These items were selected from a pool of items used in previous studies by Driver and Brown (1978) in other parts of the country. For analysis and data reporting purposes, statistically and logically related items are grouped into scales (i.e., a small group of items defining the same type of recreation experience, such as enjoyment of nature, development of skills, escaping noise back home, etc.). Similar scales can be combined even further into experience domains. Domains

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<sup>5</sup>Appendix A, Figure A-2.

are broader concepts than scales, and are composed of one or more scales which together represent a similar general theme, such as general escape, learning, achievement, etc. This study reports the users' responses to both the scales and domains described by the selected recreation experience preference items.<sup>6</sup>

The recreation experience preference questions were presented to the respondents using a Likert response format. That format permitted the respondents to indicate the degree to which a particular type of recreation experience was preferred or valued relevant to participation in a particular activity in the Arkansas River study area. Specifically, these questions asked the degree to which each of the 40 listed experiences would either add to or detract from their satisfaction if they were to participate in their selected most important activity the following summer.<sup>7</sup> Responses to this format were obtained on a nine-point response format from "most strongly adds" to "most strongly detracts."

A second section using a Likert response format solicited users' opinions on specific management issues of special concern to Arkansas River BLM planners and managers. The 17 questions focusing on possible management considerations were developed with input from the BLM staff of the Canon City District. Users responded to the questions using a seven-point response format from "strongly favor" to "strongly oppose."

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<sup>6</sup>Refer to Appendix A, Table A-1 for the complete list of items, scales, and domains used in this study. Also, refer to Driver (1977) for a complete list of the recreation experience preferences.

<sup>7</sup>A total of 42 recreation experience preference items were included on the questionnaire. The first two items were not analyzed because respondents need a couple of items to become accustomed to the response format. Only results from 40 items are reported.



Implementation of the ROS system, adopted by the BLM for recreation planning requires knowledge of the attributes of the recreation setting which are perceived by users as important to a satisfying recreation experience. Two sections on the mail questionnaire assessed the degree to which selected resource (environmental) attributes and social conditions affected user satisfaction in the Arkansas River study area. The nine-point "adds to-detracts from satisfaction" response format described above was used to solicit user preferences for 35 selected environmental features. A slightly different format was used for eight social condition questions where respondents indicated the extent each listed social condition was a problem to them personally during their visit to the area. Responses were obtained on a five-point scale from "not at all" to "extreme."

Questions about social and demographic characteristics of the recreationists were included to describe better the people visiting the Arkansas River. Information was obtained concerning each respondent's age, sex, education, community population, and zip code of permanent residence. In addition, respondents were asked about previous visits, participation in activities, their most important activity, and their overall satisfaction with their visit to the Arkansas River area.

#### Data Collection

Recipients of the mail questionnaires were randomly selected from the sample frames of names and addresses provided by the exit interviewing. A survey packet containing the questionnaire, cover letter, and postage-paid return envelope was mailed to each selected user. Those people who did not respond to the first mailing were sent a second survey packet three weeks after the mailing, and a subsequent third packet three weeks later if no

response was received after the second mailing. Respondents who completed and returned the questionnaires, and that portion of the sample whose survey packets were returned as non-deliverable, were not sent questionnaires during follow-up mailings.

Anticipating a possible low response rate to a lengthy full questionnaire (green), two additional partial (shorter) questionnaires were sent to two separate groups of Arkansas users to increase the respondent numbers. Since response to the full questionnaire was better than response to the partial questionnaire, a fourth group of users was sent the full questionnaire (white), and the respondents to the two partial questionnaires were discarded from the mail questionnaire analysis.

### Analysis

Analysis of the mailback questionnaire data using the Colorado State University CYBER 172 computer was done after the questionnaire information was coded, keypunched on computer cards, and verified for accuracy. Statistical analysis routines were selected from the Statistical Package for the Social Sciences (Nie et al., 1975) and I-Clust (Revelle, 1976)<sup>3</sup> computer packages.

Several statistical programs (frequencies, cross-tabs, ANOVA, breakdown, etc.) from the Statistical Package for the Social Sciences (SPSS) were used to produce descriptive and summary statistics for selected questionnaire data and to compare various user groups. Data describing visitor characteristics and responses to scaled questions were analyzed using the number of responses and percentages in each response category, rank orders, means, and standard deviations. More advanced analyses were used for comparisons of identifiable user groups. A discussion of these statistics is provided below.

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<sup>3</sup>I-Clust was used to group the recreation experience preference items into scales and domains, and to group the environmental attributes into scales.

To determine the average response to selected questions, means were computed by dividing the sum of all responses by the number of respondents. When logically related items were grouped into a category (scale), a respondent's scale score was calculated, and scale score means were derived for the sample from those values. This procedure consisted of summing the individual item scores (separately for each respondent) and dividing by the number of items in the scale answered by the respondent. The overall mean scale scores were then calculated from the individual respondent scale scores. Since previous research has consistently defined a close association between items belonging to the same scale, respondents only had to answer one item from a scale to have a scale score determined. Similarly, the overall mean domain<sup>3</sup> scores for domains with multiple scales were determined by developing a domain score (from the scale scores) for each respondent and then averaging these scores to get the overall mean domain score across all respondents.

Standard deviations give one indication of the variability or variance of all the responses around the mean value. Individual item standard deviations were computed using the standard computational formula found in general statistics books. Standard deviations for multiple item scales were computed by averaging standard deviations of the items within that scale. Multiple scale domains have standard deviations averaged from the standard deviations of the scales belonging to each domain.

Rank orders are reported to determine the relative importance (highest to lowest) of a series of scores or numbers listed in the tables of this report. The score having the highest value received a rank of one, with

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<sup>3</sup>While most of the descriptive statistics and comparative analyses are presented through discussion of relationships among recreation experience preference scales, the domain values are included on most tables to: (1) define logical groupings of scales for interpretation, and (2) fully document the results of the research.

subsequent scores ranked sequentially in descending order from highest to lowest. Two or more scores with equal values were ranked the same, but were each counted individually to reflect proper ranking of subsequent data. For example, a column of rank orders might show number one ranking for each of three equal scores followed by the next score ranked fourth. That score was ranked fourth, instead of second or third, because there were three scores with higher values.

Respondents were categorized into subgroups based on the activity which they identified on the mailback questionnaire as being most important on their visit to the Arkansas River study area (e.g., campers, fishermen, river runners, etc.). Further statistical testing of the scaled questions was conducted to determine if significant differences existed between the means of each activity subgroup. A test indicating a statistically significant difference ( $p \leq .05$ )<sup>10</sup> between means suggests that the observed discrepancy would occur by chance alone 5 percent of the time or less. Loosely interpreted, if the statistical criteria are met there is strong evidence to support the premise that the subgroup means are different.

Since the analysis consisted of more than two subgroups, analysis of variance in conjunction with a Student-Newman-Keuls test was utilized to discern the pairwise differences. The analysis of variance test gave an overall indication of the existence of statistically significant differences ( $p \leq .05$ ). If differences were apparent, a Student-Newman-Keuls test isolated the differences between specific subgroups by comparing all possible combinations (pairs) of sample means. The activity subgroups were also compared

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<sup>10</sup>The probability level ( $p$ ) listed in parentheses defines the range of acceptable probability levels that was used to reject the hypothesis that the differences between the observed (sample) means were due to chance. Significant differences between the means were reported if the tests showed probability levels less than or equal to 5 percent ( $p \leq .05$ ).

on the demographic and socioeconomic variables included on the questionnaire. The analysis of variance procedure described above was used to test for subgroup mean differences in age and education.

### III. CHARACTERISTICS AND PREFERENCES OF RECREATION USERS

This part of the report focuses on the characteristics and preferences of visitors to the Arkansas River study area (hereafter referred to as Arkansas River).<sup>11</sup> The data shown in the ensuing tables were analyzed from the mail-back questionnaire. The recreationists sampled are characterized by age, sex, education, and size of place of permanent residence. Specific activity preferences, recreation experience preferences (REP's), and preferences for possible management actions are all outlined based on the responses of the Arkansas River recreationists.

#### Mail Questionnaire Response

The full questionnaire (green) was sent to the first sample of Arkansas River users in September, 1978, followed by an initial mailing to the second sample receiving the full questionnaire (white) in November, 1978. Table 1 presents the response rates for each of these questionnaires compiled after three mailings to each sample of recreationists receiving the full questionnaire. Seventy-five percent of the people receiving the two full questionnaires returned them completed and ready for keypunching. Approximately 3 percent of the total sample did not receive the questionnaires, which were subsequently classified as non-deliverable. When the number of non-deliverable questionnaires was subtracted from the total number mailed, the effective sample size was determined. Given the sample size, the response rate was considered

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<sup>11</sup>Appendix F contains results from selected analyses of the "grab sample" mailback questionnaire data.



Table 1. Response to the Arkansas River questionnaire mailings (Summer, 1978).<sup>a</sup>

Questionnaires <sup>b</sup>	Sample Size	Non-deliverable	Effective Sample Size <sup>c</sup>	Returned Complete	Response Rate Percentage <sup>d</sup>
Green	500	13	487	380	78
White	378	16	362	260	72

<sup>a</sup>The questionnaires were sent through the postal system in the fall of 1978.

<sup>b</sup>Copies of the questionnaires can be found in Appendix A, Figure A-1. The "green" and "white" questionnaires were identical.

<sup>c</sup>Effective sample size reflects the number of people actually receiving the questionnaire.

<sup>d</sup>Percentage calculated by dividing the number of returned questionnaires by the effective sample size.

adequate to produce a representative sample of the population of Arkansas River study area recreationists. The results presented in this report are based on analysis of the two full questionnaires (green and white). Since the questionnaires were identical and statistical tests of the data indicated that the samples were drawn from the same population, the green and white questionnaire respondents were combined for analysis.

### Sample Summary Statistics

#### Characteristics of Visitors to the Arkansas River Study Area

Selected demographic and socioeconomic characteristics of the Arkansas River study area sample are presented in Table 2. Respondents ranged from 17 to 75 years of age, with a mean age of 42 years. The number of users in each of the three age categories (between the ages of 26 and 65) was fairly evenly distributed, with the greatest percentage (30 percent) in the 36 to 50 category. Over two-thirds (71 percent) of the respondents sampled were male.<sup>12</sup> Average education was equivalent to two years of college with 57 percent of the respondents having at least one year of college education. While 40 percent of the respondents came from communities of more than 100,000 people, an equal proportion were from communities of 25,000 or fewer people.

Another important characteristic of recreation users is the familiarity each has with the recreation environment. Arkansas River users' familiarity

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<sup>12</sup>The sample clearly overrepresents male recreationists. Sampling people in vehicles as they exit the study area provides a difficult setting for randomly selecting male and female respondents. Prospective female respondents invariably do not end up in our name and address sample frame because: (1) males quickly volunteer answer; (2) females seek help from males; or (3) the male name is usually given for the mail return questionnaire.

Table 2. Age, sex, education and community size of respondents sampled in Arkansas River study area (Summer, 1978).

Age (N=552)	Age	Percent	
	Under 18	1	
	18 - 25	12	
	26 - 35	27	Mean = 42 years
	36 - 50	30	
	51 - 65	24	
	Over 65	6	
<hr/>			
Sex (N=555)	Sex	Percent	
	Male	71	
	Female	29	
<hr/>			
Education (N=550)	Years of Formal Schooling	Percent	
	12 or under	43	Mean = 14 years
	13 - 16	42	
	Over 16	15	
<hr/>			
Community Size <sup>a</sup> (N=554)	Population	Percent	
	500,000 or more	13	
	100,000-500,000	27	
	25,000-100,000	20	
	5,000-25,000	17	
	Below 5,000	11	
	Rural	12	

<sup>a</sup>Population of the community where the respondent resides.

was measured by asking respondents to indicate the total number of visits they had made to the area during the summer of 1978 (Table 3). Over 50 percent of the respondents had been contacted by the interviewers on their only visit to the study area during the specified period. Thirty-four percent of the respondents had made two to six visits during that summer. Approximately one-seventh of the sample could be characterized as fairly familiar with the Arkansas River, having made at least seven visits during the summer of 1978.

#### Recreation Activity Summary

A summary of the Arkansas River recreation activities is shown in Table 4. Respondents checked all the activities they participated in during the summer of 1978. Rank orders for activities were calculated by assigning the highest ranks to the activities with the most respondents indicating participation. The activity most frequently mentioned was sightseeing/auto driving. Other activities with over 40 percent respondent participation were camping, fishing, hiking, picnicking, wildlife viewing, and photography.

The "most important" activity of each respondent was determined by asking which activity each person engaged in the most while visiting the Arkansas River. Responses to this question form the basis for most of the comparative analysis incorporated in this report. It is important to be familiar with the terminology, "most important" activity, and to understand the question asked of respondents.

Sightseeing/auto driving also showed the highest percentage of users as a most important activity, followed by fishing, camping, and rafting,<sup>13</sup> each with more than 5 percent of the respondents (Table 5). In combination,

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<sup>13</sup>Due to small sample sizes the kayakers and tubers are combined with the rafters into one activity group, "river runners," for the comparative analyses presented in this report.

Table 3. Total number of visits made to the Arkansas River study area (Summer, 1978).

Number of Visits <sup>a</sup>	Number of Respondents	Percent <sup>b</sup>
1	258	52
2 - 3	112	22
4 - 6	61	12
7 - 15	54	11
16 - 30	10	2
Over 30	5	1

<sup>a</sup>Total number of visits to the Arkansas River study area during the summer (June-September) of 1978.

<sup>b</sup>Percentage values are calculated based on N=501 respondents answering this question.

Table 4. Number of respondents sampled indicating participation in specific activities in the Arkansas River study area (Summer, 1978).<sup>a</sup>

Activity	Number of Respondents <sup>b</sup>	Percent <sup>c</sup>	Rank Order <sup>d</sup>
Sightseeing/Auto Driving	480	85	1
Wildlife Viewing	357	64	2
Photography	338	60	3
Picnicking	331	59	4
Camping	285	51	5
Hiking	284	51	6
Fishing	247	44	7
Nature Study	143	25	8
Rafting	80	14	9
Tubing	17	3	10
Kayaking	5	1	11

<sup>a</sup>Since recreationists could participate in more than one activity, the percent column will not total 100 percent.

<sup>b</sup>Number of respondents sampled who indicated recreation participation in the listed activity.

<sup>c</sup>Percentage values are based on N=562 respondents answering this question.

<sup>d</sup>Activities are ranked in descending order based on the number of respondents in each activity.



Table 5. The most important activity of the respondents sampled in the Arkansas River study area (Summer, 1978).

Most Important Activity <sup>a</sup>	Number of Respondents <sup>b</sup>	Percent <sup>c</sup>
Sightseeing/Auto Driving	133	29
Fishing	108	24
Camping	100	22
Rafting	43	9
Hiking	22	5
Picnicking	11	2
Photography	11	2
Nature Study	8	2
Wildlife Viewing	6	1
Kayaking	3	1
Tubing	2	< 1 <sup>d</sup>
Other Activities	12	3

<sup>a</sup>Activities are listed in descending order based on the number of respondents. Activities which were not listed as a most important activity by any of the respondents are not included in this table.

<sup>b</sup>Number of respondents sampled who listed this activity as the one they engaged in the most during their visit to the Arkansas River study area.

<sup>c</sup>Percentages are calculated based on N=459 respondents answering this question.

<sup>d</sup>Less than one percent.

Tables 4 and 5 show clearly that the Arkansas River users engage in a variety of activities during their visits, and that some activities, such as wildlife viewing, photography and sightseeing, are engaged in frequently during visits to participate in other "most important" activities.

The activity subgroups appear to explain some of the variation in the characteristics reported by Arkansas River users. Respondent's age and education and respondent's total number of 1978 summer visits by membership in selected "most important" activity groups are shown in Tables 6 and 7, respectively.

Table 6 presents the results of the analysis of user demographic characteristics by subgroups of recreationists based on most important activity. The Student-Newman-Keuls test for differences revealed that for both age and education, river runners tend to be different from all other activity groups. As a group, they are younger and have significantly more years of formal schooling.

Respondents listing fishing as their most important activity had the highest number of visits during the summer of 1978 (Table 7). Thirty-two percent of that group visited the area more than seven times. Sightseers represent the opposite extreme, with more than three-fourths of them visiting the Arkansas for the first time. It is likely that people who previously were sightseers on their first trip would return to the area with a specific activity in mind and fall into one of the other most important activity groups. That is one possible explanation for the high percentage of first time visitors in that activity group compared to the other activity groups. Also, the Arkansas River corridor is used extensively by recreationists traveling through it to other destinations.

Table 6. Significant difference in age and education between groups based on most important activity of respondents sampled in the Arkansas River study area (Summer, 1978).

	Most Important Activity Groups				Groups that Differ Significantly <sup>b</sup>
	1	2	3	4	
	Camping (N=100) <sup>a</sup> Mean	Fishing (N=107) <sup>a</sup> Mean	River Running (N=47) <sup>a</sup> Mean	Sightseeing/ Auto Driving (N=130) <sup>a</sup> Mean	
Age (years)	43	45	34	41	2,1,4>3
Education (years of formal schooling)	14	13	15	14	3>1,4,2

<sup>a</sup>Calculations are based on at least the number of respondents indicated by N.

<sup>b</sup>This column indicates that each activity group (1-4) to the left of the ">" has a mean that is significantly greater than the mean of each group to the right, based on the Student-Newman-Keuls test ( $p \leq .05$ ).

Table 7. Total number of visits of respondents sampled in the Arkansas River study area, grouped by their most important activity (Summer, 1978).

Number of Visits <sup>a</sup>	Most Important Activity			
	Camping (N=90)	Fishing (N=102)	River Running (N=45)	Sightseeing/ Auto Driving (N=115)
	Percent <sup>b</sup>	Percent <sup>b</sup>	Percent <sup>b</sup>	Percent <sup>b</sup>
1	58	22	58	76
2 - 3	27	20	18	16
4 - 6	8	28	9	7
7 - 15	6	27	9	1
16 - 30	2	4	2	0
Over 30	1	1	4	0

<sup>a</sup>Total number of visits to the Arkansas River study area during the summer (June-September) of 1978.

<sup>b</sup>Percentage values are based on the number of respondents indicated by N.

### Recreation Experience Preferences

Several different levels of data specificity and statistics for data analysis are used to document the recreation experience preferences (REP's) of Arkansas River recreationists. This section presents a subset of this information, including: (1) overall REP's of the Arkansas River sample; (2) REP's of recreationists participating in selected "most important" activities; and (3) differences between REP scores of users participating in the different activities.<sup>14</sup>

The 40 REP items analyzed from the mail questionnaires were grouped according to previous research into 37 scales and 17 domains (Table 8). The REP scale scores, like the individual REP item scores, can vary from +4 (most strongly adds to satisfaction) to -4 (most strongly detracts from satisfaction). While the scale means for the Arkansas River sample indicated that all of the scales measured experiences which added to the respondents' satisfaction, the means ranged from 0.1 (i.e., neutral) for the Risk Taking scale to a 3.4 (i.e., strongly adds to satisfaction) for the Scenery scale. REP scales were rank ordered from those with the highest means to scales with the lowest means. Scales with identical means were assigned equivalent ranks, and subsequent ranks were adjusted to reflect the number of scales with higher ranks. Scenery was ranked number one, followed by the Escape Daily Routines, General Nature Experience, Tranquility, and Seek Open Space scales, all tied for the number two ranking. All scales in the Risk Taking, Meeting-Observing New People, and Escaping Family domains showed relatively low ranks for the respondents as a whole.

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<sup>14</sup>Comprehensive documentation of the REP analysis is in Appendix B, Tables B-1 and B-2. Included in these tables are the means, standard deviations, and number of respondents for the REP items, scales, and domains for all sampled recreationists in the Arkansas River study area. Detailed REP analyses are also available for all recreationists categorized by most important activity.

Table 8. Recreation experience preference domain and scale (offset to the right) means for respondents sampled in the Arkansas River study area (Summer, 1978).

Recreation Experience Preferences Domain Scale	Mean <sup>a</sup>		Rank of Scale Means <sup>b</sup>
	Domain	Scale	
1. Relationships with Nature	3.3		
Scenery		3.4	1
General Nature Experience		3.3	2
2. Physical Rest	3.0		
Physical Rest		3.0	6
3. Escape Physical Pressure	2.9		
Tranquility		3.3	2
Privacy		2.2	22
Seek Open Space		3.3	2
Escape Crowds		3.0	6
Escape Physical Stressors		2.7	11
4. Family Togetherness	2.9		
Family Togetherness		2.9	9
5. Escape Personal-Social Pressure	2.7		
Tension Release		2.4	19
Slow Down Mentally		2.8	10
Escape Role Overloads		2.5	18
Escape Daily Routine		3.3	2
6. General Learning	2.7		
General Learning		2.6	13
Exploration		3.0	6
Geography of Area		2.5	13
Learn About Nature		2.6	13
7. Being with People	2.7		
Being with Friends		2.7	11
Being with Similar People		2.6	13
8. Exercise/Physical Fitness	2.6		
Exercise/Physical Fitness		2.6	13
9. Security	2.2		
Social Security		2.2	22
10. Leadership/Autonomy	2.1		
Independence		2.4	19
Control Power		2.0	26
Teaching-Sharing Skills		1.8	29
11. Equipment	2.1		
Equipment		2.1	25
12. Creativity	2.0		
Creativity		2.0	26
13. Achievement	1.8		
Reinforcing Self-Image		2.3	21
Social Recognition		1.8	29
Skill Development		2.2	22
Seeking Stimulation		0.8	34
14. Reflect on Personal Values	1.3		
Spiritual		1.9	23
Introspection		1.7	31
15. Meeting-Observing New People	1.0		
Meeting New People		1.5	33
Observing Other People		0.5	35
16. Risk Taking	0.9		
Risk Taking		0.1	37
Risk Avoidance		1.6	32
17. Escaping Family	0.4		
Escaping Family		0.4	36

<sup>a</sup>Means are based on responses to a nine-point response format ranging from +4 (most strongly adds) to -4 (most strongly detracts). Calculations for each domain or scale are based on at least N=348 respondents. See Appendix B for a more detailed presentation of REP statistics.

<sup>b</sup>Ranks are based on mean scores on the REP scales, with tied scores given the same rank.

It is often difficult to identify the REP scales most relevant to land management planning. Intuitively, scales defining concepts most dependent on the resource, using the resource as an active ingredient or agent to deliver the experience opportunities, and having the highest absolute mean differences between subgroups of recreationists will tend to be most relevant to resource planners and managers. Several scales meeting these criteria from Table 8 are the Privacy, Escape Crowds, Meeting New and Observing Other People, Risk Taking, Skill Development, and Competence Testing scales. REP scales showing the largest differences between subgroups of users are discussed in the following section.

#### REP Differences Between User Groups

Table 9 shows a breakdown of the scales and domains by those "most important" activity groups with sample sizes large enough for comparative analysis. Escape Daily Routine, Scenery, General Nature Experience, Tranquility, and Seeking Open Space scales continued to be ranked high across all activity groups. Overall, the river runners appeared to rank the scales in the Achievement domain higher than the other activity groups.

A more rigorous approach to analyzing the differences on the REP scales between the four most important activity groups is presented in the far right column of Table 9. A Student-Newman-Keuls test in conjunction with analysis of variance ( $p \leq .05$ ) was used to identify pairwise differences between the activity group means. The activity groups can be identified by numbers assigned in the activity group column headings. Under the column labeled "Groups That Differ Significantly," any activity groups (1, 2, 3, or 4) that are to the left of the ">" (greater than) sign have means that are significantly larger than the mean of any activity groups (1, 2, 3, or 4) to the right of that sign. There is a direct (one-to-one)

Table 9. Recreation experience preference domain (D) and scale (S) (offset to the right) means for respondents sampled in the Arkansas River study area (Summer, 1978).

Most Important Activity Groups														
		1			2			3			4			
		Camping (N=70) <sup>a</sup>			Fishing (N=73) <sup>a</sup>			River Running (N=38) <sup>a</sup>			Sightseeing/ Auto Driving (N=98) <sup>a</sup>			
Recreation Experience Preferences	Domain Scale	Mean <sup>b</sup>		Ranks of Scale Means <sup>c</sup>	Mean <sup>b</sup>		Ranks of Scale Means <sup>c</sup>	Mean <sup>b</sup>		Ranks of Scale Means <sup>c</sup>	Mean <sup>b</sup>		Ranks of Scale Means <sup>c</sup>	Groups That Differ Significantly <sup>d</sup>
		D	S		D	S		D	S		D	S		
1.	Relationships with Nature	3.3			3.1			3.2			3.5			
	Scenery		3.5	2		2.9	6		3.2	3		3.6	1	4>3,2 and 1>2
	General Nature Experience		3.2	6		3.2	1		3.3	1		3.3	2	NSD
2.	Physical Rest	3.2			3.2			2.2			3.0			
	Physical Rest		3.2	6		3.2	1		2.2	18		3.0	9	1,2,4>3
3.	Escape Physical Pressure	2.9			2.8			2.9			2.9			
	Tranquility		3.3	3		3.2	1		3.0	6		3.3	2	NSD
	Privacy		2.1	27		2.4	19		2.0	23		2.0	28	NSD
	Seek Open Space		3.3	3		3.2	1		3.3	1		3.2	6	NSD
	Escape Crowds		3.1	8		2.9	6		3.1	5		3.1	7	NSD
	Escape Physical Stressors		2.8	11		2.5	12		3.0	6		2.7	13	NSD
4.	Family Togetherness	3.3			2.6			2.4			3.3			
	Family Togetherness		3.3	3		2.6	10		2.4	16		3.3	2	1,4>2,3
5.	Escape Personal-Social Pressure	2.9			2.7			2.4			2.8			
	Tension Release		2.5	20		2.5	12		2.1	21		2.4	18	NSD
	Slow Down Mentally		2.8	11		2.8	8		2.5	14		2.9	10	NSD
	Escape Role Overloads		2.7	13		2.5	12		2.1	21		2.6	16	NSD
	Escape Daily Routine		3.6	1		3.1	5		3.2	3		3.3	2	1>3,2
6.	General Learning	2.7			2.4			2.5			2.8			
	General Learning		2.6	15		2.6	10		2.5	14		2.7	13	NSD
	Exploration		3.1	8		2.5	12		3.0	6		3.1	7	1,4,3>2
	Geography of Area		2.7	13		2.2	23		2.2	18		2.6	16	NSD
	Learn About Nature		2.6	15		2.3	21		2.2	18		2.8	12	4>3
7.	Being with People	2.8			2.4			2.8			2.8			
	Being with Friends		3.0	10		2.4	19		2.8	11		2.9	10	1,4>2
	Being with Similar People		2.6	15		2.5	12		2.9	10		2.7	13	NSD
8.	Exercise/Physical Fitness	2.6			2.8			3.0			2.3			
	Exercise/Physical Fitness		2.6	15		2.8	8		3.0	6		2.3	19	3,2>4
9.	Security	2.6			1.9			2.4			2.1			
	Social Security		2.6	15		1.9	26		2.4	16		2.1	22	1>2



Table 9. Continued.

Recreation Experience Preferences Domain Scale		Most Important Activity Groups												Groups That Differ Significantly <sup>d</sup>
		1			2			3			4			
		Camping (N=70) <sup>a</sup>			Fishing (N=73) <sup>a</sup>			River Running (N=38) <sup>a</sup>			Sightseeing/ Auto Driving (N=98) <sup>a</sup>			
		Mean <sup>b</sup> D S	Ranks of Scale Means <sup>c</sup>		Mean <sup>b</sup> D S	Ranks of Scale Means <sup>c</sup>		Mean <sup>b</sup> D S	Ranks of Scale Means <sup>c</sup>		Mean <sup>b</sup> D S	Ranks of Scale Means <sup>c</sup>		
10.	Leadership/Autonomy	2.2			2.1			1.9			2.0			
	Independence		2.4	21		2.5	12		2.0	23		2.2	21	NSD
	Control Power		2.2	25		2.1	24		1.9	26		2.0	27	NSD
	Teaching-Sharing Skills		1.9	29		1.8	28		1.9	26		1.9	29	NSD
11.	Equipment	2.4			2.5			1.5			1.7			
	Equipment		2.4	21		2.5	12		1.5	32		1.7	30	2,1>4,3
12.	Creativity	2.4			1.2			1.4			2.1			
	Creativity		2.4	21		1.2	32		1.4	34		2.1	22	1,4>3,2
13.	Achievement	1.6			1.7			2.3			1.6			
	Reinforcing Self-Image		2.3	24		2.1	24		2.8	11		2.1	22	3>4,2
	Social Recognition		1.6	33		1.5	30		2.0	23		2.3	19	4>1,2
	Skill Development		2.2	25		2.3	21		2.7	13		1.7	30	3,2>4
	Seeking Stimulation		0.4	35		0.6	35		1.9	26		0.5	35	3>2,4,1
14.	Reflect on Personal Values	1.9			1.7			1.6			1.9			
	Spiritual		2.0	28		1.9	26		1.5	32		2.1	22	NSD
	Introspection		1.7	31		1.5	30		1.7	30		1.7	30	NSD
15.	Meeting-Observing New People	1.2			0.7			1.0			1.2			
	Meeting New People		1.7	31		1.1	33		1.7	30		1.6	33	NSD
	Observing Other People		0.7	34		0.3	36		0.2	36		0.8	34	NSD
16.	Risk Taking	0.8			1.0			1.5			0.8			
	Risk Taking		-0.5	37		0.2	37		1.9	26		-0.5	37	3>2,4,1
	Risk Avoidance		1.8	30		1.6	29		0.9	35		2.1	22	4,1,2>3
17.	Escaping Family	-0.3			1.1			0.0			0.5			
	Escaping Family		-0.3	36		1.1	33		0.0	37		0.5	35	2>3,1

<sup>a</sup>Calculations for each domain or scale are based on at least the number of respondents indicated by N.

<sup>b</sup>Means are based on responses to a nine-point response format ranging from +4 (most strongly adds) to -4 (most strongly detracts). See Appendix B for a more detailed presentation of activity group REP statistics.

<sup>c</sup>Ranks are based on mean scores on the REP scales, with tied scores given the same rank.

<sup>d</sup>This column indicates that each activity group (1-4) to the left of the ">" has a mean that is significantly greater than the mean of each group to the right, based on the Student-Newman-Keuls test ( $p \leq .05$ ). Some REP scales showed no significant differences (NSD) between the activity groups.

statistical relationship between the activity groups separated by a sign (>). Therefore, river runners and fishermen each have significantly greater means on the Exercise/Physical Fitness scale than do the sightseers. Campers (group 1) had an intermediate mean value on this scale which is not significantly different from the groups on either extreme. An NSD notation in the column indicates that "no significant differences" were found between any of the activity group means for the appropriate REP scale.

Overall, 18 of the 37 REP scales reported in this study show differences between the means of at least two of the activity groups (Table 9). In most cases, the differences occur between at least three activity groups, with four activity groups involved in half the REP scales showing significant differences. REP dimensions valued the least (low means and ranks) by Arkansas users tend to have a higher percentage of scales with significant mean differences between the activity groups than the REP's with the higher means. It is apparent that there is greater consensus among activity groups regarding the experiences they believe added the most to perceived satisfaction than those REP's considered to add the least to perceived satisfaction.

All four activity groups tend to exhibit about the same total number of REP differences. Yet, identification of the specific mean differences for the individual activity groups show some interesting trends. Whereas, fishermen and river runners derived less satisfaction from social interactions, being creative, and general learning experiences than members of the other two activity groups, they valued exercise and development of skills more highly. River runners can be characterized by their higher preferences for exciting experiences. Dimensions which reflect this orientation include the higher means on Seeking Stimulation and Risk Taking, and lower means on Risk Avoidance and Physical Rest. Contrasted to the river runners are the campers

who more greatly sought social experiences with family, friends, and considerate people. Fishermen can be distinguished from all other groups by their stronger preferences for escaping their families, while the sightseers differed from the other activity groups by higher scores on the Scenery and Learn About Nature scales.

These comparisons indicate that recreationists with different affiliations use the Arkansas River to realize a variety of recreation experiences. Identifiable user groups have distinct patterns of experience preferences, and often rate the relative importance of those experience preferences differently.

#### Management Action Preferences

The recreationists in the Arkansas River sample were asked whether they favored or opposed 17 specific "possible management actions." This section summarizes the results of the questions about users' preferences for those management actions. Included in this summary are: (1) responses of the overall sample of Arkansas River recreationists; and (2) differences in preferences of groups based on users' most important activities.

Table 10 lists the means, standard deviations, and rank orders of the management items presented to all respondents of the mail questionnaire. Twelve of the management actions were favored at least "moderately" to "strongly" by the Arkansas River users. Provision of trash receptacles, pull-off and scenic overlooks, and informational signs were among the most favored actions, while the management actions prohibiting or restricting certain types of use were slightly opposed by respondents.

The means listed in Table 10 do not give a clear picture of the management actions. One measure of the variability in the user responses to the management actions is given by the standard deviations. Several standard deviations in

Table 10. Management item means and standard deviations for all respondents sampled in the Arkansas River study area (Summer, 1978).

Possible Management Actions	Mean <sup>a</sup>	S.D. <sup>b</sup>	Rank Order <sup>c</sup>
Provide trash receptacles at undeveloped sites	1.9	1.3	1
Develop more pull-off and parking facilities along Highway 50	1.6	1.6	2
Provide more information about regulations, facilities, and activities in the area	1.4	1.2	3
Provide informational signs on the river specifying river conditions, dangers, etc.	1.4	1.5	3
Provide scenic overlooks along Highway 50	1.2	1.5	5
Provide vault toilets at undeveloped sites	1.2	1.6	5
Construct hiking trails along the river	1.1	1.6	7
Provide drinking water at a greater number of locations in the area	1.0	1.4	8
Provide more camping facilities which might be up to 1/2 mile from the river	1.0	1.7	8
Expand the access and parking facilities at Five Points Recreation Site	0.9	1.4	10
Allow camping only at sites designated for camping	0.9	2.2	10
Construct foot bridges across the river	0.7	1.8	12
Provide graveled put-in and take-out points along the river for boats, rafts, canoes, etc.	0.2	1.6	13
Provide surfaced put-in and take-out points along the river for boats, rafts, canoes, etc.	0.0	1.7	14
Prohibit grazing of livestock in the area	-0.2	1.8	15
Prohibit all camping within 100 feet of the river	-0.2	2.2	15
Establish a permit system which regulates the number of river users, but only for the heavily used stretches of the river	-0.3	1.9	17

<sup>a</sup>Means are based on responses to a seven-point response format ranging from +3 (very strongly favor) to -3 (very strongly oppose). Calculations for each management action are based on at least N=537 respondents.

<sup>b</sup>Standard deviation (S.D.) is a measure of variation in the responses around the mean.

<sup>c</sup>Ranks are based on mean scores on the possible management actions, with tied scores given the same rank.

Table 10 are large, indicating that the respondents varied quite a bit in their preferences, resulting in answers widely distributed around the mean. This dispersion is illustrated in Table 11 by the percentage distribution of individual answers in each response category. For example, the mean for the management action proposing a prohibition on camping within 100 feet of the river was -0.2. Yet, only 29 percent of the sample answered in response categories, "neutral" or "moderately oppose," near the mean for all users. Forty-three percent of the respondents preferred one of the two extreme categories at either end of the scale, which indicates strong opinions favoring and opposing that action. The large (2.2) standard deviation (Table 10) for that item reflects the variation in the responses. While the general trend was to favor most of the management actions, there was considerable disagreement on many of the actions.

#### Preferences of Recreationists in Selected Activity Groups

Considerable differences exist between "most important" activity groups in their opinions of the management actions, based on the Student-Newman-Keuls test (Table 12). This helps explain some of the variation identified in Tables 10 and 11. Twelve of the 17 possible management actions showed significant differences between the means of at least two of the four most important activity groups, and some of these discrepancies are great. Nine management items have differences at least as large as 1.0 on the seven-point response format. The largest difference between activity group means occurs between river runners and campers, sightseers, and fishermen on the possible management action proposing the construction of foot bridges across the river. River runners slightly opposed that action, while members of the other activity groups were moderately in favor of it (i.e., in Table 12, activity groups 4,

Table 11. Preferences for possible management actions of respondents sampled in the Arkansas River study area (Summer, 1978).

Possible Management Actions	Very Strongly Favor (+3) Percent <sup>a</sup>	Strongly Favor (+2) Percent <sup>a</sup>	Moderately Favor (+1) Percent <sup>a</sup>	Neutral (0) Percent <sup>a</sup>	Moderately Oppose (-1) Percent <sup>a</sup>	Strongly Oppose (-2) Percent <sup>a</sup>	Very Strongly Oppose (-3) Percent <sup>a</sup>	Number of Respondents
Provide trash receptacles at undeveloped sites	43	24	21	9	< 1	1	2	537
Develop more pull-off and parking facilities along Highway 50	38	23	19	11	5	1	4	554
Provide more information about regulations, facilities, and activities in the area	20*	31	29	17	2	< 1	1	549
Provide informational signs on the river specifying river conditions, dangers, etc.	28	23	24	18	3	2	3	546
Provide scenic overlooks along Highway 50	23	22	27	20	3	1	4	552
Provide vault toilets at undeveloped sites	24	20	29	17	3	2	5	547
Construct hiking trails along the river	23	21	22	22	4	2	6	548
Provide drinking water at a greater number of locations in the area	17	18	31	24	5	1	3	552
Provide more camping facilities which might be up to 1/2 mile from the river	22	20	25	20	4	3	7	546
Expand the access and parking facilities at Five Points Recreation Site	17	18	22	35	4	1	3	537
Allow camping only at sites designated for camping	35	16	13	9	8	6	14	552
Construct foot bridges across the river	20	15	26	20	6	4	10	547
Provide graveled put-in and take-out points along the river for boats, rafts, canoes, etc.	8	11	20	40	7	5	10	541
Provide surfaced put-in and take-out points along the river for boats, rafts, canoes, etc.	7	11	18	35	10	6	14	551
Prohibit grazing of livestock in the area	11	5	11	38	10	6	18	554
Prohibit all camping within 100 feet of the river	19	9	9	17	12	11	24	553
Establish a permit system which regulates the number of river users, but only for the heavily used stretches of the river	10	8	16	28	9	7	23	551

<sup>a</sup>Percentages are based on the total number of respondents answering each possible management action.

Table 12. Management items showing significant differences between mean responses of groups based on most important activity of respondents sampled in the Arkansas River study area (Summer, 1978).

Possible Management Actions	Most Important Activity Groups				Groups That Differ Significantly
	1	2	3	4	
	Camping (N=93) <sup>a</sup> Mean <sup>b</sup>	Fishing (N=101) <sup>a</sup> Mean <sup>b</sup>	River Running (N=45) <sup>a</sup> Mean <sup>b</sup>	Sightseeing/ Auto Driving (N=128) <sup>a</sup> Mean <sup>b</sup>	
Develop more pull-off and parking facilities along Highway 50	2.0	1.4	0.8	1.8	1>2,3 and 4,2>3
Provide scenic overlooks along Highway 50	1.4	0.6	0.7	1.7	4,1>3,2
Provide vault toilets at undeveloped sites	1.6	0.9	1.0	1.2	1>3,2
Construct hiking trails along the river	1.4	0.4	1.0	1.4	4,1,3>2
Provide drinking water at a greater number of locations in the area	1.2	0.8	0.6	1.2	1,4>3
Provide more camping facilities which might be up to 1/2 mile from the river	1.6	0.7	0.4	0.9	1>4,2,3
Expand the access and parking facilities at Five Point Recreation Site	1.3	0.8	0.2	1.0	1,4,2>3
Construct foot bridges across the river	1.0	0.7	-0.3	1.0	4,1,2>3
Provide graveled put-in and take-out points along the river for boats, rafts, canoes, etc.	0.1	-0.4	0.3	0.6	4,3,1>2
Provide surfaced put-in and take-out points along the river for boats, rafts, canoes, etc.	0.1	-0.6	-0.7	0.4	4,1>2,3
Prohibit all camping within 100 feet of the river	-0.9	-0.4	0.2	0.0	3,4>1
Establish a permit system which regulates the number of river users, but only for the heavily used stretches of the river	-0.4	-1.1	-0.1	0.1	4,3,1>2

<sup>a</sup>Calculations for each management item are based on at least the number of respondents indicated by N.

<sup>b</sup>Means are based on responses to a seven-point format from +3 (very strongly favor) to -3 (very strongly oppose). See Appendix C for a more detailed presentation of management item statistics for activity groups.

<sup>c</sup>This column indicates that each activity group (1-4) to the left of the ">" has a mean that is significantly greater than the mean of each group to the right, based on the Student-Newman-Keuls test ( $p \leq .05$ ). These are the only significant differences between any of the activity group means for each management item.

1, 2>3). Additionally, several other management actions isolate well-defined preferences of campers, fishermen, and river runners that are each significantly different from the preferences of all other activity groups. Campers more strongly favored more camping facilities and vault toilets and opposed camping restrictions within 100 feet of the river. Fishermen can be characterized by their greater opposition to a permit system and graveled ramps to the river and their lesser support for construction of hiking trails. Besides their opposition to foot bridges, river runners less strongly favored parking, facility development, and more drinking water than the other activity groups. Overall, the campers and sightseers tended to favor the development-oriented management actions more than the fishermen and river runners.<sup>15</sup>

#### Recreation Setting Attribute Preferences

An important component of recreation demand is the value placed on attributes of the biophysical, social, and managerial environments. This section presents the results of questions which focused directly on assessing user attribute preferences. Included here are: (1) overall user preferences for specific social conditions in the Arkansas River; (2) differences in social condition preferences of users participating in different "most important" activities; and (3) overall environmental feature preferences of the Arkansas River sample; and (4) differences in environmental feature preferences of users participating in different "most important" activities.

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<sup>15</sup>Table C-1 in Appendix C contains a full breakdown on each management action of the mean, standard deviation, and number of respondents for each most important activity group.



### Arkansas River Recreationists Social Condition Preferences

Social conditions of a recreation setting may have a strong influence on the ability of recreation resource users to realize the quality recreation experiences they desire. Social conditions include, but are not limited to, the number and types of people encountered, noise, and litter. Eight social items describing certain social conditions were included on the Arkansas River questionnaires (Table 13). While the respondents considered all the social conditions to be a problem to some extent, seeing litter on the river and noticing human impact were given the highest "problem" scores. Actually seeing and hearing other people was less of a problem than visible signs of previous use by other Arkansas River recreationists. Brightly colored equipment and considerate people were considered to be only a slight problem.

Preferences of Recreationists from Selected Activity Groups. Responses to the social conditions were homogeneous between users in each of the four most important activity groups. Only one social condition, that of seeing litter along the river, showed any differences between the activity groups (Table 14). Fishermen considered this to be significantly more of a problem than sightseers.<sup>16</sup>

### Arkansas River Users' Preferences for Environmental Attributes

Respondents indicated how much each of 35 specific environmental features would add to or detract from a satisfying recreation experience on a future visit to the Arkansas River study area. Cluster analysis was used to group these items into 15 environmental feature preference scales. Eight of these scales each contain two or more closely related environmental feature items.

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<sup>16</sup>Table D-1 in Appendix D contains a full breakdown for each social item of the mean, standard deviation, and number of respondents for each most important activity group.

Table 13. Social item means and standard deviations for all respondents sampled in the Arkansas River study area (Summer, 1978).

Social Items	Mean <sup>a</sup>	S.D. <sup>b</sup>	Rank Order <sup>c</sup>
Seeing litter along the river	3.2	1.4	1
Noticing the impact of human use on the soils, vegetation, or other natural features of the area	2.8	1.2	2
Being near large groups of people	2.3	1.3	3
Being near loud, noisy people	2.2	1.3	4
Encountering other people too frequently in the area	2.0	1.1	5
Seeing many other people using the area	1.9	1.1	6
Seeing brightly colored equipment of other users	1.6	0.9	7
Being near considerate, respectful people	1.6	1.1	7

<sup>a</sup>Means are based on responses to a five-point response format ranging from 5 (extreme problem) to 1 (not at all a problem). Calculations for each social item are based on at least N=384 respondents.

<sup>b</sup>Standard deviation (S.D.) is a measure of variation in the responses around the mean.

<sup>c</sup>Social items are ranked in descending order based on the degree to which each was considered a problem, with tied scores given the same rank.

Table 14. Social items showing significant differences between mean responses of groups based on most important activity of respondents sampled in the Arkansas River study area (Summer, 1978).

Social Items	Most Important Activity Groups				Groups That Differ Significantly <sup>c</sup>
	1	2	3	4	
	Camping (N=94) <sup>a</sup> Mean <sup>b</sup>	Fishing (N=97) <sup>a</sup> Mean <sup>b</sup>	River Running (N=45) <sup>a</sup> Mean <sup>b</sup>	Sightseeing/ Auto Driving (N=119) <sup>a</sup> Mean <sup>b</sup>	
Seeing litter along the river	3.2	3.6	3.3	2.9	2>4

<sup>a</sup>Calculations for this social item are based on the number of respondents indicated by N.

<sup>b</sup>Means are based on responses to a five-point response format ranging from 5 (extreme problem) to 1 (not at all a problem). See Appendix D for a more detailed presentation of social item statistics for activity groups.

<sup>c</sup>This column indicates that each activity group (1-4) to the left of the ">" has a mean that is significantly greater than the mean of each group to the right, based on the Student-Newman-Keuls test ( $p \leq .05$ ). These are the only significant differences between any of the activity group means for each social item.

The other seven scales consist of single items from the questionnaire which did not cluster consistently with other items, but were judged to be of interest to the study area managers.<sup>17</sup>

Table 15 presents the means and rank orders for the 15 environmental feature preference scales. Clean, fresh air and panoramic views were the features of the study area environment which were considered to add the most to user satisfaction. Intrusions and pollution ranked the lowest, detracting the most from a satisfying recreation experience.

Preferences of Recreationists from Selected Activity Groups. The Student-Newman-Keuls analyses for mean differences between "most important" activity groups on their preferences for environmental features yielded fairly predictable results. On the seven environmental feature scales showing differences, the larger differences generally occur between the fishermen and river runners (Table 16). Users from the other activity groups are involved in most of the differences, but the fishermen and river runners have the extreme mean values. Overall, environmental features which added little to or detracted from the river runners' satisfaction (slow moving water, bridges, and fishing) were the same features that added to fishermen's perceived satisfaction. Similarly, rapids were valued more by river runners than fishermen. Sightseers and campers generally had means falling between the fishermen and river runners.<sup>18</sup> Two exceptions are the bridges and man-made intrusions scales, where the campers' and sightseers' means were higher than the river runners' and fishermen's means for that feature.

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<sup>17</sup>Appendix D, Table D-2, contains complete documentation of the environmental feature preferences scales and items.

<sup>18</sup>Table D-3 in Appendix D contains a full breakdown for each environmental feature scale, including the mean, standard deviation, and number of respondents for each most important activity group.

Table 15. Environmental feature preference scale means for respondents sampled in the Arkansas River study area (Summer, 1978).

Environmental Feature Preference Scales <sup>a</sup>	Mean <sup>b</sup>	S.D. <sup>c</sup>	Ranks of Scale Means <sup>d</sup>
Clean, fresh air *	3.6	1.0	1
Panoramic views *	3.0	1.2	2
Vegetation	2.8	1.3	3
Attractive topography	2.7	1.4	4
Wildlife	2.7	1.4	4
Rapids *	2.6	1.5	6
Fishing *	2.5	1.6	7
Historic features	2.0	1.8	8
Bridges *	1.0	2.0	9
Livestock *	0.6	2.1	10
Slow-moving water *	0.6	1.9	10
Navigational problems	-0.2	1.8	12
Nuisance factors	-0.5	2.1	13
Man-made intrusions	-1.1	2.2	14
Pollution	-3.3	1.8	15

<sup>a</sup>Scales with an asterisk (\*) are single-item scales. All other scales are composed of two or more closely related environmental feature preference items. Refer to Appendix D for further details.

<sup>b</sup>Means are based on responses to a nine-point response format from +4 (most strongly adds) to -4 (most strongly detracts). See Appendix D for a more detailed description of environmental features preference scale statistics for activity groups.

<sup>c</sup>Standard deviations (S.D.) for multiple-item scales are computed by averaging the standard deviation of the items within that scale.

<sup>d</sup>Ranks are based on mean scores on the environmental feature preference scales, with tied scores given the same rank.

Table 16. Environmental feature preference scales showing significant differences between mean responses of groups based on most important activity of respondents sampled in the Arkansas River study area (Summer, 1978).

Environmental Feature Preference Scales <sup>a</sup>	Most Important Activity Groups				Groups That Differ Significantly <sup>d</sup>
	1	2	3	4	
	Camping (N=86) <sup>b</sup> Mean <sup>c</sup>	Fishing (N=90) <sup>b</sup> Mean <sup>c</sup>	River Running (N=43) <sup>b</sup> Mean <sup>c</sup>	Sightseeing/ Auto Driving (N=117) <sup>b</sup> Mean <sup>c</sup>	
Panoramic views*	3.0	2.6	3.1	3.2	4,3,1>2
Fishing*	2.5	3.5	1.7	2.2	2>1,4,3 and 1>3
Rapids*	2.6	2.3	3.1	2.6	3>2
Historic features	2.3	1.6	1.7	2.0	1>3,2
Bridges*	1.4	0.7	-0.4	1.2	1,4,2>3
Slow-moving water*	0.3	1.1	-0.2	0.5	2>1,3 and 4>3
Man-made intrusions	-0.8	-1.7	-2.2	-0.8	4,1>2>3

<sup>a</sup>Scales with an asterisk (\*) are single-item scales. All other scales are composed of two or more closely related environmental feature preference items. Refer to Appendix D for further details.

<sup>b</sup>Calculations for each environmental feature preference scale are based on at least the number of respondents indicated by N.

<sup>c</sup>Means are based on responses to a nine-point response format from +4 (most strongly adds) to -4 (most strongly detracts). See Appendix D for a more detailed description of environmental feature preference scale statistics for activity groups.

<sup>d</sup>This column indicates that each activity group (1-4) to the left of the ">" has a mean that is significantly greater than the mean of each group to the right, based on the Student-Newman-Keuls test ( $p < .05$ ). These are the only significant differences between any of the activity group means for each environmental feature preference scale.

Overall Level of Satisfaction with Visit

In general, users were highly satisfied with their visit to the Arkansas River study area. The mean response of the 53 respondents who answered this question was 2.8 on the nine-point scale from +4 (very highly satisfied) to -4 (very highly dissatisfied). The standard deviation for the total sample was low at 1.1.

Table 17 shows the results of the Student-Newman-Keuls test for differences between the means of the activity groups. When compared to all other groups, fishermen reported a significantly lower level of overall satisfaction with their visits to the study area.

Table 17. Differences in overall satisfaction with visit to the Arkansas River study area between groups of respondents based on most important activity (Summer, 1978).<sup>a</sup>

	Most Important Activity Groups				Groups that Differ Significantly <sup>d</sup>
	1	2	3	4	
	Camping (N=99) <sup>b</sup> Mean <sup>c</sup>	Fishing (N=108) <sup>b</sup> Mean <sup>c</sup>	River Running (N=48) <sup>b</sup> Mean <sup>c</sup>	Sightseeing/ Auto Driving (N=131) <sup>b</sup> Mean <sup>c</sup>	
Overall Satisfaction	2.9	2.4	3.0	3.0	3,4,1>2

<sup>a</sup> Respondents were asked to rate their overall satisfaction with the visit to the Arkansas River study area during which they were interviewed at the traffic stop.

<sup>b</sup> Calculations for this item are based on the number of respondents indicated by N.

<sup>c</sup> Mean scores are based on responses to a nine-point response format ranging from +4 (very highly satisfied) to -4 (very highly dissatisfied).

<sup>d</sup> This column indicates that each activity group (1-4) to the left of the ">" has a mean that is significantly greater than the mean of each group to the right, based on the Student-Newman-Keuls test ( $p \leq .05$ ).



#### IV. SUMMARY AND DISCUSSION

The primary objectives of this research were to identify and quantify the recreation experience preferences of users visiting the Arkansas River Area and measure and quantify recreation participation in that area.<sup>19</sup> Additionally, several other sub-objectives (refer to Introduction) were developed to provide managers other information describing characteristics and preferences of Arkansas River users. Preceding a discussion of several distinctive REP preference characteristics is a summary of the results.

##### Summary

##### Overall Sample Summary

The data collected identifying the demographic characteristics of Arkansas River study area users indicate that users' ages are distributed fairly evenly from 26 to 65 years, with a mean for the sample of about 42 years. Males outnumbered females by three to one, and 57 percent of the respondents had more than 12 years of formal schooling, the average being 13.8 years of school. Twenty percent of the sample came from communities of 25,000 to 100,000 people, and an equal proportion (40 percent) came from communities either larger (100,000 or above) or smaller (25,000 or below) than that.

More than 50 percent of the recreationists made only one visit to the study area during the summer (June-September) of 1978. Fourteen percent visited the area seven or more times during that summer.

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<sup>19</sup>Analysis and discussion of the recreation participation data collected during the exit interviewing are presented in Appendix E.

Most people participated in several different activities during their visits to the study area. Eighty-five percent of all respondents had participated in sightseeing and/or auto driving. Wildlife viewing and photography ranked second and third in total participation. Camping, fishing, hiking, picnicking, and fishing were each undertaken by more than 40 percent of the users; while 18 percent ran the river by one means or another.

When asked to indicate their "most important" activity (the activity they had engaged in the most during their visit), 75 percent of the sample indicated either sightseeing/auto driving, fishing, or camping. Rafting was a most important activity for 9 percent of the sample.

The major focus of this research effort was the quantification of user preferences for each of 37 dimensions (scales) measuring identifiable outcomes. Respondents were asked to indicate whether specific REP items describing each dimension added to or detracted from their satisfaction while engaging in their "most important" activity in the Arkansas River. Overall, the Arkansas River users perceived that 17 of the REP scales "strongly added" to their satisfaction. The five REP groupings (domains) adding the most to user perceived satisfaction primarily describe non-stressful recreation experiences. The Relationships with Nature domain contained REP scales that added the most to user satisfaction followed by scales in the Physical Rest, Escape Physical Pressure, Family Togetherness, and Escape Personal-Social Pressure domains. While means indicated that no REP scale or domain detracted from user perceived satisfaction, several scales (Escaping Family, Risk Taking, and Observing Other People) were all rated neutral, neither adding to nor detracting from user satisfaction.

Respondents' support or opposition to 17 possible management actions for the study area were elicited on a seven-point (+3 to -3) scale. Users

avored providing more trash receptacles above all other management actions. Management actions which also ranked high were developing more pull-off and parking facilities along Highway 50, providing more information about regulations, facilities, and activities in the area, and providing informational signs on river conditions and dangers. On the average, respondents were neutral about 5 of the 17 management actions. Establishment of a permit system for the heavily used stretches of the river had the lowest mean.

Recreationists also indicated the degree to which eight social attributes (conditions) had been a problem to them during their visit to the Arkansas River study area. Possible responses ranged from 1 (not at all a problem) to 5 (an extreme problem). Seeing litter on the river was perceived to be the number one ranking social problem, followed by noticing the impact of human use on the soils, vegetation, or other natural features of the area. Mean values for all eight social items show that users considered all those conditions to be at least a moderate problem.

Thirty-five environmental features measuring components of perceived user satisfaction were consolidated into 15 environmental feature preference scales for analysis. The clean, fresh air scale received the highest ranking with a mean of 3.6 on a +4 to -4 scale. Panoramic views, vegetation, attractive topography, and wildlife also ranked high in their contribution to satisfying recreation experiences in the study area. Intrusions such as fences, resort development, and pollution (particularly water pollution and litter) were rated as detracting from recreationists' satisfaction.

### Summary of Activity Group Differences

Four recreation subgroups were identified for further comparative analysis, based on the "most important" activity of the users. These were groups of individuals whose most important activity was: (1) camping; (2) fishing; (3) river running (combined rafting, tubing, and kayaking); or (4) sightseeing/auto driving. Student-Newman-Keuls tests ( $p \leq .05$ ) were used to identify significant differences between these groups in their mean responses to the items on the questionnaire. Statistically significant differences which characterize the four groups are discussed below.

Camping. Campers accounted for 22 percent of the entire sample. They differed from all other groups in their higher REP mean on Escape Daily Routine, and were significantly higher than some other groups in the amount of satisfaction added by Scenery, Social Security, Being with Friends, and Family Togetherness. As a group, campers favored selected management actions more than some or all of the other groups. These actions were more scenic overlooks, vault toilets at undeveloped sites, and more camping facilities to within one-half mile of the river. They differed from sightseers and river runners in their stronger opposition to prohibitions against camping within 100 feet of the river. Also, one environmental feature, historic features, added more to their satisfaction than to that of fishermen and river runners.

Fishing. Twenty-four percent of the sample indicated that fishing was their most important activity. This group had significantly lower means than some or all other groups on several REP scales, including Being with Friends, Social Security, Exploration, and Scenery. Higher REP means were recorded for fishermen on Escaping Family, Skill Development, and Equipment. Also,

fishermen differed significantly by their weaker preferences for hiking trails and gravelled or surfaced put-in and take-out points along the river, and their opposition to a permit system on heavily used stretches of the river. With regard to environmental features, fishermen had the lowest mean on panoramic views and highest mean for fishing opportunities. Fishermen considered seeing litter on the river to be more of a problem than did sightseers, and expressed a lower level of overall satisfaction with their visit to the Arkansas River when compared to all other groups.

River running. River runners, which included 11 percent of the sample, had significantly higher means on several REP scales than other most important activity groups. First, river runners had higher preferences for the "excitement" REP's, Risk Taking and Seeking Stimulation. They also had higher means than some of the groups on Skill Development, Reinforcing Self-Image, and Exercise/Physical Fitness. In contrast, Risk Avoidance and Physical Rest contributed significantly less to the satisfaction of river runners than to all other groups. River runners also had means significantly below all other groups for two management actions, the construction of foot bridges and expansion of access and parking at Five Points. Fishing opportunities, bridges, and slow water were features of the environment which added less to river runners' satisfaction than to the satisfaction perceived by users in some other groups. As a group, the river runners were the youngest and best educated.

Sightseeing/auto driving. Comprising 29 percent of the total sample, sightseers had the least distinctive preferences of the four activity groups. Enjoying social recreation opportunities, sightseers indicated that they derived more satisfaction from Being with Friends, Family Togetherness, Social

Recognition, Scenery, and Learning About Nature than did selected other groups. Less emphasis was put on skill development by sightseers than fishermen or river runners. Also, sightseers and auto drivers favored more pull-off parking and more scenic overlooks on Highway 50 than some other groups. Finally, this group considered seeing litter on the river to have been less of a problem on their visit than did fishermen.

### Discussion

Results of the analyses regarding recreation experience preferences lead to several general conclusions about the characteristics of Arkansas River area users. First, the recreation experience preferences of Arkansas River users indicate that those users have distinct patterns in their expected and desired outcomes of recreation participation. Inherent in these patterns are identifiable recreation experiences that are strongly influenced by resource management decisions. For example, one conclusion from the REP data is that the Arkansas River users prefer non-stressful recreation experiences, and those preferences could be reflected in the high percentage of users engaging in the "leisurely" activities (sightseeing/auto driving, car camping, photography, wildlife viewing, etc.). Although these users, for the most part, do not interact with the resource as much as recreationists engaging in more physical activities, several of the REP dimensions (Scenery, General Nature Experience, Tranquility, Open Space, and Privacy) valued the most by the leisurely groups are all dependent on the resource base that is directly controlled by Arkansas River managers. Since this non-stressful orientation is extremely important to many Arkansas River users, resource managers should be cognizant of how their decisions could influence the bundle of most highly valued experiences. Awareness by resource managers of the recreation experiences

valued (most and least) by users can help managers provide better quality recreation opportunities.

Second, Arkansas River users engaging in different recreation activities have different preferences for recreation experiences. While Student-Newman-Keuls tests isolated many REP differences between the four activity groups, one finding was particularly evident. The largest and most consistent differences occurred between recreationists in activity groups "actively" using the river resource (fishermen and river runners), and those users in activity groups "passively" observing or using the resource (sightseers and car campers). Although not apparent in all REP differences, this finding is best supported by a few key REP differences. Those users in the active group preferred the active and self-motivating dimensions (Exercise/Physical Fitness and Skill Development) more than members of the passive group.

This is contrasted by the social interaction preferences of the passive group best illustrated by their high means on Family Togetherness, Creativity, Escape Daily Routine, and Being with Friends. In addition to this discernible overall trend, each activity group can be further characterized by distinctive REP preferences inherent only to members of each group.

Third, to provide quality recreation experiences to users engaging in different recreation activities in the Arkansas River study area, resource managers need to focus special attention on some of the recreation experience preferences that add the least to user perceived satisfaction. It was evident from the REP analyses that the largest absolute differences and greatest number of differences between the four "most important" activity groups (on the REP scales) occurred in dimensions (domains) with the lowest means. Apparently, members of different activity groups recreating in the Arkansas River study

area have a strong consensus for their most preferred recreation experience, which indicates that the bundle of highest valued recreation experiences is similar between activity groups. Another possible explanation is that users generally are disinterested in some of the REP scales contributing the least to their satisfaction, and this might cause their responses to be less consistent between items belonging to the same scale and scales belonging to the same domain. If so, in addition to between activity variation evident from the difference tests, there should also be large within activity variability. The standard deviations for those REP scales for each activity group in Appendix B are not significantly higher than other REP standard deviations, indicating relatively consistent within group variation. Therefore, it is apparent that, if one goal of recreation management in the Arkansas River study area is to provide quality recreation experiences to users in different activity groups, (1) opportunities must be provided for users to realize that bundle of most highly valued experiences, and (2) special attention needs to be focused on the REP's, not as highly valued, that clearly delineate distinctive preferences of users in different activity groups.



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APPENDIX A

ARKANSAS RIVER QUESTIONNAIRES

(Summer, 1978)

# Figure A-1. Exit Interview Form.

IDENT \_\_\_\_\_ 75-80

1 INTERVIEWER \_\_\_\_\_ 2 STUDY AREA \_\_\_\_\_ 3 STATION \_\_\_\_\_  
4-6 DATE \_\_\_\_\_ 7 TIME OF WEEK: WEEKDAY (1) WEEKEND (2) HOLIDAY (3)

8 TRIP PURPOSE: REC (1) NON-REC (2) TO-FROM REC (3) 9 TRIP ORIGIN: WITHIN STUDY AREA (1) OUTSIDE AREA (2) OUTSIDE-COMMUTER (3)  
10-12 TOTAL TIME SPENT IN AREA \_\_\_\_\_ HOURS

TIME SPENT IN EACH ZONE (HRS.):

1 2 3 4 5

13-15 16-18 19-21 22-24 25-27

ACTIVITY	ZONES	TOTAL HOURS	ACTIVITY	ZONES	TOTAL HOURS
1) CAMPING NEAR AUTO 31-33		28-30	14) NATURE STUDY 70-72 73-74 (02)		67-69
2) CAMPING AWAY FROM AUTO 34-36		31-33	15) PHOTOGRAPHY ID. 75-80 C3: 1-3		70-72 73-74 (01) ID. 75-80 C2: 1-3
3) PICNICKING 37-39		34-36	16) WILDLIFE VIEWING 4-6		
4) SIGHTSEEING-AUTO DRIVING 40-42		37-39	17) WATCHING RACES 7-9		4-6
5) 4-WHEEL DRIVING 43-45		40-42	18) SUNBATHING 10-12		7-9
6) MOTORCYCLING 46-48		43-45	19) COMPETING - RACES 13-15		10-12
7) BICYCLING 49-51		46-48	20) TUBING 16-18		13-15
8) COLLECTING 52-54		49-51	21) KAYAKING 19-21		16-18
9) HIKING/WALKING 55-57		52-54	22) BOATING 22-24		19-21
10) HORSEBACK RIDING 58-60		55-57	23) SWIMMING 25-27		22-24
11) FISHING 61-63		58-60	24) RAFTING 28-30		25-27
12) TECHNICAL MT. CLIMBING 64-66		61-63	25) OTHER 31-33		28-30
13) HUNTING 67-69		64-66			

34-35 WHICH ACTIVITY WAS MOST IMPORTANT TO YOU AS A REASON FOR VISITING THIS AREA? (ABOVE #) \_\_\_\_\_

36-37 PREVIOUS VISITS TO THE AREA WITHIN THE PAST 12 MONTHS? # \_\_\_\_\_

38 IF 0; HAVE YOU EVER BEEN HERE BEFORE? YES (1) NO (2)

39 GROUP COMPOSITION: FAMILY (1) FRIENDS (2) FAMILY & FRIENDS (3) ORGANIZED GROUP (4) ALONE (5)

40-41 RIVER USE: (IF ACTIVITY #21, 22, OR 24 CHECKED) 40 PUT IN \_\_\_\_\_ 41 TAKE OUT \_\_\_\_\_

ADDRESS OF PERMANENT RESIDENCE:

C4: 1 (1), 2-29 NAME \_\_\_\_\_ 73-74 (04), ID. 75-80  
C5: 2-35 STREET ADDRESS \_\_\_\_\_ 73-74 (05), ID. 75-80  
C6: 2-30 CITY, STATE \_\_\_\_\_ 31-35 ZIP \_\_\_\_\_ 73-74 (06), ID. 75-80

42 TYPE OF VEHICLE: CAR (1) TRUCK (2) VAN (3) CAMPER (4) MOTORHOME (5) MOTORCYCLE (6) 4-WHEEL DRIVE (7) OTHER (8)

43 TRAILER TYPE: UTILITY TRAILER (1) CAMPER TRAILER (2)

44-45 TOTAL # OF PEOPLE IN VEHICLE \_\_\_\_\_

-15		16-20		21-35		36-55		+55		CARS # PASSED
M	F	M	F	M	F	M	F	M	F	
46	47	48	49	50	51	52	53	54	55	56 57

58-59 TOTAL # OF ADDRESSES \_\_\_\_\_

60-61 TIME OF DAY \_\_\_\_\_

73-74 (03)

75-80 IDENT

\*\* SMILE \*\*

# Figure A-2. Mail Questionnaire.

## ARKANSAS RIVER AREA QUESTIONNAIRE

This questionnaire has been designed to learn more about the preferences of the users of the Arkansas River Area between Canon City and Salida. Please answer the questions based on your experiences in the Arkansas River Area during the past summer (June - September, 1978).

- I. How many total visits did you make to the Arkansas River Area this past summer (June - September, 1978)? \_\_\_\_\_ Total Visits (1:1-2)
- II. The following question contains issues of special concern to the managers of the Arkansas River Area between Canon City and Salida. Please circle the number which best describes how much you favor (+) or oppose (-) each of the "Possible Management Actions" listed for that area. Circle only one number for each possible action.

Possible Management Actions	FAVOR			Neutral	OPPOSE			
	Very Strongly	Strongly	Moderately		Moderately	Strongly	Very Strongly	
1) Provide drinking water at a greater number of locations in the area	+3	+2	+1	0	-1	-2	-3	(1:3)
2) Provide more information about regulations, facilities, and activities in the area	+3	+2	+1	0	-1	-2	-3	
3) Provide informational signs on the river specifying river conditions, dangers, etc.	+3	+2	+1	0	-1	-2	-3	(1:5)
4) Construct foot bridges across the river	+3	+2	+1	0	-1	-2	-3	
5) Prohibit all camping within 100 feet of the river	+3	+2	+1	0	-1	-2	-3	
6) Allow camping only at sites designated for camping	+3	+2	+1	0	-1	-2	-3	
7) Provide more camping facilities which might be up to 1/2 mile from the river	+3	+2	+1	0	-1	-2	-3	
8) Develop more pull-off and parking facilities along Highway 50	+3	+2	+1	0	-1	-2	-3	(1:10)
9) Provide scenic overlooks along Highway 50	+3	+2	+1	0	-1	-2	-3	
10) Expand the access and parking facilities at Five Points Recreation Site	+3	+2	+1	0	-1	-2	-3	
11) Provide vault toilets at undeveloped sites	+3	+2	+1	0	-1	-2	-3	
12) Provide trash receptacles at undeveloped sites	+3	+2	+1	0	-1	-2	-3	
13) Construct hiking trails along the river	+3	+2	+1	0	-1	-2	-3	(1:15)
14) Prohibit grazing of livestock in the area	+3	+2	+1	0	-1	-2	-3	
15) Provide surfaced put-in and take-out points along the river for boats, rafts, canoes, etc.	+3	+2	+1	0	-1	-2	-3	
16) Provide graveled put-in and take-out points along the river for boats, rafts, canoes, etc.	+3	+2	+1	0	-1	-2	-3	
17) Establish a permit system which regulates the number of river users, but only for the heavily used stretches of the river	+3	+2	+1	0	-1	-2	-3	(1:19)

- III. The items below specify environmental features which can affect whether or not you have an enjoyable recreation experience. Please rate each of the following features in terms of how much it would add to (+) or detract from (-) the satisfaction you would receive if you were to visit the Arkansas River Area next summer (summer of 1979). Please circle only one number for each item. If any item would not pertain to your visit next summer, circle 9 in the NOT APPLICABLE column.

Environmental Features	EFFECT ON SATISFACTION									
	Adds to					Detracts from				
	Most Strongly	Strongly	Moderately	Slightly	Neither Adds Nor Detracts	Slightly	Moderately	Strongly	Most Strongly	Not Applicable
1) Rugged terrain	+4	+3	+2	+1	0	-1	-2	-3	-4	0 (1:21)
2) Fast and churning rapids	+4	+3	+2	+1	0	-1	-2	-3	-4	
3) Variety of birds	+4	+3	+2	+1	0	-1	-2	-3	-4	
4) Wildflowers	+4	+3	+2	+1	0	-1	-2	-3	-4	
5) Historic landmarks	+4	+3	+2	+1	0	-1	-2	-3	-4	0 (1:25)

V. Please check each of the activities you participated in when visiting the Arkansas River Area this past summer. (1:74) (1)

- |  |  |  |
|--|--|--|
| 1) <input type="checkbox"/> Camping    | 5) <input type="checkbox"/> Wildlife viewing | 9) <input type="checkbox"/> Rafting                    |
| 2) <input type="checkbox"/> Fishing    | 6) <input type="checkbox"/> Nature study     | 10) <input type="checkbox"/> Photography               |
| 3) <input type="checkbox"/> Hiking     | 7) <input type="checkbox"/> Kayaking         | 11) <input type="checkbox"/> Sightseeing/auto driving  |
| 4) <input type="checkbox"/> Picnicking | 8) <input type="checkbox"/> Tubing           | 12) <input type="checkbox"/> Other (please list) _____ |
- (2:1-12)

Different types of outdoor recreation opportunities provide users with different types of experiences. Managers of the Arkansas River Area would like to know what adds to or detracts from the level of satisfaction you get from visiting that area. Because people's preferences change for different activities, these questions should be answered with only one activity which you engaged in most at the Arkansas River Area. Please list the activity in the blank.

(2:13-14)

Imagine that you were to engage in that one activity, listed above, at the Arkansas River Area next summer (summer of 1979). Then rate how much you think each of the following types of experiences would either add to (+) or detract from (-) the level of satisfaction you would receive from engaging in that activity. If any of the items would not pertain to your trip next summer, please circle 9, NOT APPLICABLE.

Type of Experience	EFFECT ON SATISFACTION									
	Adds to				Neither Adds Nor Detracts	Detracts from				Not Applicable
	Most Strongly	Strongly	Moderately	Slightly		Slightly	Moderately	Strongly	Most Strongly	
1) Being active	+4	+3	+2	+1	0	-1	-2	-3	-4	9
2) Getting out-of-doors	+4	+3	+2	+1	0	-1	-2	-3	-4	9
3) Being on your own	+4	+3	+2	+1	0	-1	-2	-3	-4	9
4) Gaining a sense of self-confidence	+4	+3	+2	+1	0	-1	-2	-3	-4	9 (2:24)
5) Getting to know the lay of the land	+4	+3	+2	+1	0	-1	-2	-3	-4	9 (2:25)
6) Being away from the family for a while	+4	+3	+2	+1	0	-1	-2	-3	-4	9
7) Being near considerate people	+4	+3	+2	+1	0	-1	-2	-3	-4	9
8) Developing your skills and abilities	+4	+3	+2	+1	0	-1	-2	-3	-4	9
9) Sharing your knowledge with others	+4	+3	+2	+1	0	-1	-2	-3	-4	9
10) Being sure of what will happen to you	+4	+3	+2	+1	0	-1	-2	-3	-4	9 (2:30)
11) Being with other people who enjoy the same thing you do	+4	+3	+2	+1	0	-1	-2	-3	-4	9
12) Viewing the scenery	+4	+3	+2	+1	0	-1	-2	-3	-4	9
13) Thinking about who you are	+4	+3	+2	+1	0	-1	-2	-3	-4	9
14) Doing something creative such as sketching, painting, photography, etc.	+4	+3	+2	+1	0	-1	-2	-3	-4	9
15) Releasing or reducing some built-up tensions	+4	+3	+2	+1	0	-1	-2	-3	-4	9 (2:35)
16) Having more privacy	+4	+3	+2	+1	0	-1	-2	-3	-4	9
17) Experiencing the fast-paced nature of things	+4	+3	+2	+1	0	-1	-2	-3	-4	9
18) Feeling your independence	+4	+3	+2	+1	0	-1	-2	-3	-4	9
19) Meeting new people	+4	+3	+2	+1	0	-1	-2	-3	-4	9
20) Using your equipment	+4	+3	+2	+1	0	-1	-2	-3	-4	9 (2:40)
21) Relaxing physically	+4	+3	+2	+1	0	-1	-2	-3	-4	9
22) Having a change from your everyday life	+4	+3	+2	+1	0	-1	-2	-3	-4	9
23) Exploring the area	+4	+3	+2	+1	0	-1	-2	-3	-4	9
24) Developing personal spiritual values	+4	+3	+2	+1	0	-1	-2	-3	-4	9
25) Learning more about nature	+4	+3	+2	+1	0	-1	-2	-3	-4	9 (2:45)
26) Doing something with your family	+4	+3	+2	+1	0	-1	-2	-3	-4	9
27) Observing other people in the area	+4	+3	+2	+1	0	-1	-2	-3	-4	9
28) Chancing dangerous situations	+4	+3	+2	+1	0	-1	-2	-3	-4	9
29) Telling others about the trip	+4	+3	+2	+1	0	-1	-2	-3	-4	9
30) Getting away from the demands of other people	+4	+3	+2	+1	0	-1	-2	-3	-4	9 (2:50)

Table A-1. Recreation experience preference domains, scales (designated by numbers), and items (designated by lower case letters) used in the Arkansas River study (Summer, 1978).

---

Domain A: Achievement

1. Reinforcing Self-Image
  - a. Gaining a sense of self-confidence.
2. Social Recognition
  - a. Telling others about the trip.
3. Skill Development
  - a. Developing your skills and abilities.
4. Skill Stimulation
  - a. Experiencing the fast-paced nature of things.

Domain B: Leadership/Autonomy

1. Independence
  - a. Being on your own.
  - b. Feeling your independence.
2. Control Power
  - a. Being in control of things that happen.
3. Teaching-Sharing Skills
  - a. Sharing your knowledge with others.

Domain C: Risk Taking

1. Risk Taking
  - a. Chancing dangerous situations.
2. Risk Avoidance
  - a. Being sure of what will happen to you.

Domain D: Equipment

1. Equipment
  - a. Using your equipment.

Domain E: Family Togetherness

1. Family Togetherness
  - a. Doing something with your family.

Domain F: Being With People

1. Being With Friends
  - a. Doing things with your companions.
2. Being With Similar People
  - a. Being with other people who enjoy the same thing you do.

Domain G: Meeting-Observing New People

1. Meeting New People
  - a. Meeting new people.
2. Observing Other People
  - a. Observing other people in the area.

Domain H: General Learning

1. General Learning
  - a. Developing your knowledge of things here.
2. Exploration
  - a. Exploring the area.
  - b. Experiencing new and different things.
3. Geography of Area
  - a. Getting to know the lay of the land.
4. Learn about Nature
  - a. Learning more about nature.

Domain I: Relationships With Nature

1. Scenery
  - a. Viewing the scenery.
2. General Nature Experience
  - a. Being where things are natural.

Domain J: Reflect on Personal Values

1. Spiritual
  - a. Developing personal spiritual values.
2. Introspection
  - a. Thinking about who you are.

Domain K: Creativity

1. Creativity
  - a. Doing something creative such as sketching, painting, photography, etc.

Domain L: Exercise/Physical Fitness

1. Exercise/Physical Fitness
  - a. Getting exercise.
  - b. Keeping physically fit.

Domain M: Physical Rest

1. Physical Rest
  - a. Relaxing physically.

Domain N: Escape Personal-Social Pressure

1. Tension Release
  - a. Releasing or reducing some built-up tensions.
2. Slow Down Mentally
  - a. Giving your mind a rest.
3. Escape Role Overloads
  - a. Getting away from the demands of other people.
4. Escape Daily Routine
  - a. Having a change from your everyday life.

Domain O: Escape Physical Pressure

1. Tranquility
  - a. Experiencing the peace and calm.
2. Privacy
  - a. Having more privacy.
3. Seek Open Space
  - a. Experiencing the open space.
4. Escape Crowds
  - a. Getting away from crowded situations for awhile.
5. Escape Physical Stressors
  - a. Being away from the noise back home.



Domain P: Security

1. Social Security

- a. Being near considerate people.

Domain Q: Escaping Family

1. Escaping Family

- a. Being away from the family for awhile.

## APPENDIX B

### RECREATION EXPERIENCE PREFERENCES

Table B-1. Recreation experience preference domain (D), scale (S), and item (I) means for respondents sampled in the Arkansas River study area (Summer, 1978).

Recreation Experience Preferences						Inter-Item Correlation <sup>d</sup>				
Domain	Scale	Item	Mean <sup>a</sup>			S.D. <sup>b</sup>	N	Alpha <sup>c</sup>	r	r̄
			D	S	I					
1.	Achievement		1.8			1.7	459	.66		.28
	Reinforcing Self-Image			2.3		1.6	392			
	Gaining a sense of self-confidence				2.3	1.6	392			
	Social Recognition		1.8			1.7	440			
	Telling others about the trip				1.8	1.7	440			
	Skill Development		2.2			1.5	402			
	Developing your skills and abilities			2.2		1.5	402			
	Seeking Stimulation		.8			2.2	385			
	Experiencing the fast paced nature of things			.8		2.2	385			
2.	Leadership/Autonomy		2.1			1.6	460	.68		.28
	Independence			2.4		1.5	443	.65	.36	
	Being on your own				2.7	1.5	428			
	Feeling your independence				2.0	1.6	404			
	Control Power		2.0			1.6	418			
	Being in control of things that happen				2.0	1.6	418			
	Teaching-Sharing Skills		1.8			1.6	412			
	Sharing your knowledge with others			1.8		1.6	412			
3.	Risk Taking		.9			2.1	438	.26	-.25	
	Risk Taking			.1		2.3	393			
	Chancing dangerous situations				.1	2.3	393			
	Risk Avoidance		1.6			1.9	398			
	Being sure what will happen to you			1.6		1.9	398			
4.	Equipment		2.1			1.5	417			
	Equipment			2.1		1.5	417			
	Using your equipment				2.1	1.5	417			
5.	Family Togetherness		2.9			1.4	427			
	Family Togetherness			2.9		1.4	427			
	Doing something with your family				2.9	1.4	427			
6.	Being with People		2.7			1.5	463	.72	.52	
	Being with Friends			2.7		1.4	443			
	Doing things with your companions				2.7	1.4	443			
	Being with Similar People		2.6			1.5	446			
	Being with other people who enjoy the same thing you do				2.6	1.5	446			
7.	Meeting-Observing New People		1.0			1.8	447	.77	.58	
	Meeting New People			1.5		1.7	429			
	Meeting new people				1.5	1.7	429			
	Observing Other People		.5			1.9	434			
	Observing other people in the area				.5	1.9	434			
8.	General Learning		2.7			1.3	465	.83		.48
	General Learning			2.6		1.3	447			
	Developing your knowledge of things here				2.6	1.3	447			
	Exploration		3.0			1.1	461	.68	.49	
	Exploring the area				2.9	1.2	443			
	Experiencing new and different things				3.0	1.1	450			
	Geography of the Area		2.6			1.4	425			
	Getting to know the lay of the land			2.6		1.4	425			
	Learning about Nature		2.6			1.3	447			
	Learning more about nature			2.6		1.3	447			
9.	Relationships with Nature		3.3			1.0	446	.65	.47	
	Scenery			3.4		.9	459			
	Viewing the scenery				3.4	.9	459			
	General Nature Experience		3.3			1.0	452			
	Being where things are natural				3.3	1.0	452			

Table B-1. Continued

Recreation Experience Preferences						Inter-Item Correlation <sup>d</sup>		
Domain Scale Item	Mean <sup>a</sup>			S.D. <sup>b</sup>	N	Alpha <sup>c</sup>	r	F
	D	S	I					
10. Reflect on Personal Values	1.8			1.6	433	.71	.44	
Spiritual		1.9		1.6	407			
Developing personal spiritual values			1.9	1.6	407			
Introspection		1.7		1.7	392			
Thinking about who you are			1.7	1.7	392			
11. Creativity	2.0			1.8	378			
Creativity		2.0		1.8	378			
Doing something creative such as sketching, painting, photography, etc.			2.0	1.8	378			
12. Exercise/Physical Fitness	2.6			1.3	449	.82	.66	
Exercise/Physical Fitness		2.6		1.3	449	.82	.66	
Getting exercise			2.7	1.3	445			
Keeping physically fit			2.6	1.4	439			
13. Physical Rest	3.0			1.3	447			
Physical Rest		3.0		1.3	447			
Relaxing physically			3.0	1.3	447			
14. Escape Personal-Social Pressure	2.7			1.4	465	.73	.37	
Tension Release		2.4		1.5	427			
Releasing or reducing some built-up tensions			2.4	1.5	427			
Slow Down Mentally		2.8		1.4	441			
Giving your mind a rest			2.8	1.4	441			
Escape Role Overloads		2.5		1.6	435			
Getting away from the demands of other people			2.5	1.6	435			
Escape Daily Routine		3.3		1.0	453			
Having a change from your everyday life			3.3	1.0	453			
15. Escape Physical Pressure	2.9			1.3	464	.76	.39	
Tranquility		3.3		1.0	452			
Experiencing the peace and calm			3.3	1.0	452			
Privacy		2.2		1.5	427			
Having more privacy			2.2	1.5	427			
Seek Open Space		3.3		1.0	455			
Experiencing the open space			3.3	1.0	455			
Escape Crowds		3.0		1.3	435			
Getting away from crowded situations for awhile			3.0	1.3	435			
Escape Physical Stressors		2.7		1.5	427			
Being away from the noise back home			2.7	1.5	427			
16. Security	2.2			1.8	426			
Social Security		2.2		1.8	426			
Being near considerate people			2.2	1.8	426			
17. Escaping Family	.4			2.3	348			
Escaping Family		.4		2.3	348			
Being away from the family for awhile			.4	2.3	348			

<sup>a</sup>Means are based on responses to a nine-point response format ranging from +4 (most strongly adds) to -4 (most strongly detracts).

<sup>b</sup>Standard deviations for multiple-item scales are computed by averaging the standard deviations of the items within that scale. Standard deviations for multiple-scale domains are computed by averaging the standard deviations of the scales within that domain.

<sup>c</sup>Alpha reliability for scales and domains consisting of more than one item using the Cronbach alpha computation for internal consistency.

<sup>d</sup>For scales and domains consisting of only two items, "r", or the correlation between the two items is reported here. The average inter-item correlation, "r", is reported for scales and domains consisting of three or more items.

Table B-2. Recreation experience preference domain (D), scale (S), and item (I) means for respondents sampled in the Arkansas River study area, grouped by their most important activity (Summer, 1978).

Recreation Experience Preferences Domain Scale Item	Camping					Fishing					River Running					Sightseeing/Auto Driving				
	Mean <sup>a</sup>					Mean <sup>a</sup>					Mean <sup>a</sup>					Mean <sup>a</sup>				
	D	S	I	S.D. <sup>b</sup>	N	D	S	I	S.D. <sup>b</sup>	N	D	S	I	S.D. <sup>b</sup>	N	D	S	I	S.D. <sup>b</sup>	N
1. Achievement	1.6			1.8	100	1.7			1.7	106	2.3			1.5	47	1.6			1.7	130
Reinforcing Self-Image		2.3		1.6	84		2.1		1.6	90		2.8		1.3	45		2.1		1.6	104
Gaining a sense of self-confidence			2.3	1.6	84			2.1	1.6	90			2.8	1.3	45			2.1	1.6	104
Social Recognition		1.6		1.8	99		1.5		1.6	101		2.0		1.5	46		2.3		1.4	126
Telling others about the trip			1.6	1.8	99			1.5	1.6	101			2.0	1.5	46			2.3	1.4	126
Skill development		2.2		1.5	88		2.3		1.4	100		2.7		1.1	45		1.7		1.6	102
Developing your skills and abilities			2.2	1.5	88			2.3	1.4	100			2.7	1.1	45			1.7	1.6	102
Seeking Stimulation		.4		2.2	81		.6		2.2	90		1.9		2.1	41		.5		2.1	108
Experiencing the fast-paced nature of things			.4	2.2	81			.6	2.2	90			1.9	2.1	41			.5	2.1	108
2. Leadership/Autonomy	2.2			1.5	100	2.1			1.5	107	1.9			1.5	47	2.0			1.5	128
Independence		2.4		1.5	96		2.5		1.5	105		2.0		1.8	45		2.2		1.5	123
Being on your own			2.9	1.3	95			2.9	1.4	100			2.3	1.9	45			2.6	1.6	115
Feeling your independence			2.0	1.6	87			2.1	1.5	96			1.9	1.7	41			1.8	1.5	115
Control Power		2.2		1.5	94		2.1		1.6	94		1.9		1.3	44		2.0		1.5	113
Being in control of things that happen			2.2	1.5	94			2.1	1.6	94			1.9	1.3	44			2.0	1.5	113
Teaching-Sharing Skills		1.9		1.6	92		1.8		1.6	98		1.9		1.4	44		1.9		1.5	112
Sharing your knowledge with others			1.9	1.6	92			1.8	1.6	98			1.9	1.4	44			1.9	1.5	112
3. Risk Taking	.8			2.0	95	1.0			2.0	101	1.5			1.7	47	.8			2.0	125
Risk Taking		-.5		2.1	84		.2		2.1	87		1.9		1.6	47		-.5		2.4	110
Chancing dangerous situations			-.5	2.1	84			.2	2.1	87			1.9	1.6	47			-.5	2.4	110
Risk Avoidance		1.8		1.8	86		1.6		1.9	93		.9		1.8	42		2.1		1.7	115
Being sure of what will happen to you			1.8	1.8	86			1.6	1.9	93			.9	1.8	42			2.1	1.7	115
4. Equipment	2.4			1.4	97	2.5			1.4	104	1.5			1.4	41	1.7			1.5	109
Equipment		2.4		1.4	97		2.5		1.4	104		1.5		1.4	41		1.7		1.5	109
Using your equipment			2.4	1.4	97			2.5	1.4	104			1.5	1.4	41			1.7	1.5	109
5. Family Togetherness	3.3			1.2	96	2.6			1.6	99	2.4			1.9	40	3.3			1.1	123
Family Togetherness		3.3		1.2	96		2.6		1.6	99		2.4		1.9	40		3.3		1.1	123
Doing something with your family			3.3	1.2	96			2.6	1.6	99			2.4	1.9	40			3.3	1.1	123
6. Being with People	2.8			1.4	100	2.4			1.6	106	2.8			1.1	47	2.8			1.3	131
Being with Friends		3.0		1.2	98		2.4		1.5	102		2.8		1.1	46		2.9		1.2	120
Doing things with your companions			3.0	1.2	98			2.4	1.5	102			2.8	1.1	46			2.9	1.2	120
Being with Similar People		2.6		1.7	98		2.5		1.6	102		2.9		1.1	47		2.7		1.3	127
Being with other people who enjoy the same thing you do			2.6	1.7	98			2.5	1.6	102			2.9	1.1	47			2.7	1.3	127
7. Meeting-Observing New People	1.2			1.9	99	.7			2.0	103	1.0			1.8	47	1.2			1.6	126
Meeting New People		1.7		1.8	97		1.1		1.9	96		1.7		1.4	47		1.6		1.5	120
Meeting new people			1.7	1.8	97			1.1	1.9	96			1.7	1.4	47			1.6	1.5	120
Observing Other People		.7		2.0	98		.3		2.0	99		.2		2.1	45		.8		1.8	121
Observing other people in the area			.7	2.0	98			.3	2.0	99			.2	2.1	45			.8	1.8	121

Table B-2. Continued

Recreation Experience Preferences		Camping					Fishing					River Running					Sightseeing/Auto Driving				
Domain Scale Item	Mean <sup>a</sup>			S.D. <sup>b</sup>	N	Mean <sup>a</sup>			S.D. <sup>b</sup>	N	Mean <sup>a</sup>			S.D. <sup>b</sup>	N	Mean <sup>a</sup>			S.D. <sup>b</sup>	N	
	D	S	I			D	S	I			D	S	I			D	S	I			
8. General Learning	2.7			1.2	100	2.4			1.3	107	2.5			1.4	47	2.8			1.2	132	
General Learning		2.6		1.2	98		2.6		1.3	103		2.5		1.2	46		2.7		1.2	123	
Developing your knowledge of things here			2.6	1.2	98			2.6	1.4	103			2.5	1.2	46			2.7	1.2	123	
Exploration		3.1		.9	100		2.5		1.4	105		3.0		1.1	47		3.1		1.0	130	
Exploring the area			3.2	.9	97			2.4	1.4	99			2.7	1.2	45			3.0	1.1	126	
Experiencing new and different things			3.1	1.0	98			2.6	1.4	102			3.2	.9	47			3.2	1.0	126	
Geography of the Area		2.7		1.3	95		2.2		1.5	97		2.2		1.5	44		2.6		1.4	118	
Getting to know the lay of the land			2.7	1.3	95			2.2	1.5	97			2.2	1.5	44			2.6	1.4	118	
Learning about nature		2.6		1.4	98		2.3		1.4	104		2.2		1.2	46		2.8		1.3	124	
Learning more about nature			2.6	1.4	98			2.3	1.4	104			2.2	1.2	46			2.8	1.3	124	
9. Relationships with Nature	3.3			.9	100	3.1			1.2	107	3.2			.9	47	3.5			.8	133	
Scenery		3.5		.7	97		2.9		1.4	106		3.2		.8	46		3.6		.6	132	
Viewing the scenery			3.5	.7	97			2.9	1.4	106			3.2	.8	46			3.6	.6	132	
General Nature Experience		3.2		1.0	100		3.2		1.1	103		3.3		.9	46		3.3		1.0	126	
Being where things are natural			3.2	1.0	100			3.2	1.1	103			3.3	.9	46			3.3	1.0	126	
10. Reflect on Personal Values	1.9			1.6	94	1.7			1.6	100	1.6			1.5	43	1.9			1.6	122	
Spiritual		2.0		1.6	88		1.9		1.6	98		1.5		1.5	41		2.1		1.6	109	
Developing personal spiritual values			2.0	1.6	88			1.9	1.6	98			1.5	1.5	41			2.1	1.6	109	
Introspection		1.7		1.7	86		1.5		1.6	91		1.7		1.5	41		1.7		1.6	107	
Thinking about who you are			1.7	1.7	86			1.5	1.6	91			1.7	1.5	41			1.7	1.6	107	
11. Creativity	2.4			1.5	88	1.2			1.7	73	1.4			1.7	38	2.1			1.9	113	
Creativity		2.4		1.5	88		1.2		1.7	73		1.4		1.7	38		2.1		1.9	113	
Doing something creative such as sketching, painting, photography, etc.			2.4	1.5	88			1.2	1.7	73			1.4	1.7	38			2.1	1.9	113	
12. Exercise/Physical Fitness	2.6			1.2	100	2.8			1.2	103	3.0			1.2	47	2.3			1.4	122	
Exercise/Physical Fitness		2.6		1.2	100		2.8		1.2	103		3.0		1.2	47		2.3		1.4	122	
Getting exercise			2.7	1.2	100			2.9	1.2	101			3.0	1.1	47			2.3	1.4	121	
Keeping physically fit			2.5	1.3	97			2.8	1.3	102			2.9	1.2	46			2.3	1.4	120	
13. Physical Rest	3.2			1.1	98	3.2			1.2	105	2.2			1.7	42	3.0			1.2	128	
Physical Rest		3.2		1.1	98		3.2		1.2	105		2.2		1.7	42		3.0		1.2	128	
Relaxing physically			3.2	1.1	98			3.2	1.2	105			2.2	1.7	42			3.0	1.2	128	
14. Escape Personal Social Pressure	2.9			1.2	100	2.7			1.4	106	2.4			1.5	47	2.8			1.3	133	
Tension Release		2.5		1.6	94		2.5		1.6	100		2.1		1.2	44		2.4		1.5	121	
Releasing or reducing some built-up tensions			2.5	1.6	94			2.5	1.6	100			2.1	1.2	44			2.4	1.5	121	
Slow Down Mentally		2.8		1.2	99		2.8		1.3	98		2.5		1.7	45		2.9		1.2	123	
Giving your mind a rest			2.8	1.2	99			2.8	1.3	98			2.5	1.7	45			2.9	1.2	123	
Escape Role Overloads		2.7		1.5	96		2.5		1.5	101		2.1		1.9	44		2.6		1.6	123	
Getting away from the demands of other people			2.7	1.5	96			2.5	1.5	101			2.1	1.9	44			2.6	1.6	123	
Escape Daily Routine		3.6		.7	96		3.1		1.1	103		3.2		1.0	45		3.3		1.0	131	
Having a change from your everyday life			3.6	.7	96			3.1	1.1	103			3.2	1.0	45			3.3	1.0	131	

Table B-2. Continued.

Recreation Experience Preferences		Camping				Fishing				River Running				Sightseeing/Auto Driving			
Domain	Scale	Mean <sup>a</sup>				Mean <sup>a</sup>				Mean <sup>a</sup>				Mean <sup>a</sup>			
Item		D	S	I	N	D	S	I	N	D	S	I	N	D	S	I	N
15. Escape Physical Pressure		2.9			100	2.8			106	2.9			47	2.9			133
Tranquility		3.3		.9	99	3.2		1.1	103	3.0		1.3	47	3.3		.9	127
Experiencing the peace and calm			3.3	.9	99		3.2	1.1	103		3.0	1.3	47		3.3	.9	127
Privacy		2.1		1.7	94	2.4		1.5	101	2.0		1.4	42	2.0		1.5	120
Having more privacy			2.1	1.7	94		2.4	1.5	101		2.0	1.4	42		1.0	1.5	120
Seek Open Space		3.3		1.0	100	3.2		1.1	105	3.3		1.0	47	3.2		1.0	126
Experiencing the open space			3.3	1.0	100		3.2	1.1	105		3.3	1.0	47		3.2	1.0	126
Escape Crowds		3.1		1.1	96	2.9		1.5	102	3.1		.8	45	3.1		1.3	121
Getting away from crowded situations for awhile			3.1	1.1	96		2.9	1.5	102		3.1	.8	45		3.1	1.3	121
Escape Physical Stressors		2.8		1.5	94	2.5		1.6	98	3.0		1.1	43	2.7		1.5	116
Being away from the noise back home			2.8	1.5	94		2.5	1.6	98		3.0	1.1	43		2.7	1.5	116
16. Security		2.6			98	1.9			95	2.4			46	2.1			119
Social Security			2.6		98		1.9		95		2.4		46		2.1		119
Being near considerate people				2.6	98			1.9	95			2.4	46			2.1	119
17. Escaping Family		-.3			70	1.1			87	0.0			38	0.5			98
Escaping Family			-.3		70		1.1		87		0.0		38		0.5		98
Being away from the family for awhile				-.3	70			1.1	87			0.0	38			0.5	98

<sup>a</sup>Means are based on responses to a nine-point response format ranging from +4 (most strongly adds) to -4 (most strongly detracts).

<sup>b</sup>Standard deviations for multiple-item scales are computed by averaging the standard deviations of the items within that scale. Standard deviations for multiple-scale domains are computed by averaging the standard deviations of the scales within that domain.

## APPENDIX C

### MANAGEMENT ACTION PREFERENCES



Table C-1. Management item means and standard deviations for respondents sampled in the Arkansas River study area, grouped by their most important activity (Summer, 1978).

Possible Management Actions	Most Important Activity Groups							
	Camping (N=93) <sup>a</sup>		Fishing (N=101) <sup>a</sup>		River Running (N=45) <sup>a</sup>		Sightseeing/ Auto Driving (N=128) <sup>a</sup>	
	Mean <sup>b</sup>	S.D. <sup>c</sup>	Mean <sup>b</sup>	S.D. <sup>c</sup>	Mean <sup>b</sup>	S.D. <sup>c</sup>	Mean <sup>b</sup>	S.D. <sup>c</sup>
Provide trash receptacles at undeveloped sites	2.1	1.2	2.0	1.3	1.6	1.6	1.9	1.1
Develop more pull-off and parking facilities along Highway 50	2.0	1.3	1.4	1.8	0.8	1.8	1.8	1.2
Provide more information about regulation, facilities and activities in the area	1.6	1.0	1.3	1.3	1.3	1.2	1.5	1.0
Provide informational signs on the river specifying river conditions, dangers, etc.	1.5	1.3	1.3	1.5	1.2	1.7	1.6	1.2
Provide scenic overlooks along Highway 50	1.4	1.4	0.6	1.5	0.7	1.5	1.7	1.1
Provide vault toilets at undeveloped sites	1.6	1.3	0.9	1.7	1.0	1.6	1.2	1.4
Construct hiking trails along the river	1.4	1.4	0.4	1.7	1.0	1.7	1.4	1.4
Provide drinking water at a greater number of locations in the area	1.2	1.3	0.8	1.5	0.6	1.4	1.2	1.2
Provide more camping facilities which might be up to 1/2 mile from the river	1.6	1.5	0.7	2.0	0.4	1.6	0.9	1.5
Expand the access and parking facilities at Five Points Recreation Site	1.3	1.3	0.8	1.6	0.2	1.4	1.0	1.1
Allow camping only at sites designated for camping	0.7	2.2	0.5	2.4	0.7	1.9	1.2	2.1
Construct foot bridges across the river	1.0	1.9	0.7	2.0	-0.3	1.7	1.0	1.3
Provide graveled put-in and take-out points along the river for boats, rafts, canoes, etc.	0.1	1.5	-0.4	1.7	0.3	1.6	0.6	1.3
Provide surfaced put-in and take-out points along the river for boats, rafts, canoes, etc.	0.1	1.6	-0.6	1.8	-0.7	1.6	0.4	1.5
Prohibit grazing of livestock in the area	-0.5	1.7	-0.4	1.9	-0.3	1.6	0.0	1.7
Prohibit all camping within 100 feet of the river	-0.9	2.3	-0.4	2.2	0.2	1.8	0.0	2.1
Establish a permit system which regulates the number of river users, but only for the heavily used stretches of the river	-0.4	1.8	-1.1	2.1	-0.1	1.8	0.1	1.7

<sup>a</sup>Calculations for each management item are based on at least the number of respondents indicated by N.

<sup>b</sup>Means are based on responses to a seven-point response format ranging from +3 (very strongly favor) to -3 (very strongly oppose).

<sup>c</sup>Standard deviation (S.D.) is a measure of variation in the responses around the mean.

## APPENDIX D

### RECREATION SETTING ATTRIBUTES

Table D-1. Social item means and standard deviations for respondents sampled in the Arkansas River study area, grouped by their most important activity (Summer, 1978).

Social Items	Most Important Activity Groups							
	Camping (N=74) <sup>a</sup>		Fishing (N=73) <sup>a</sup>		River Running (N=36) <sup>a</sup>		Sightseeing/ Auto Driving (N=86) <sup>a</sup>	
	Mean <sup>b</sup>	S.D. <sup>c</sup>	Mean <sup>b</sup>	S.D. <sup>c</sup>	Mean <sup>b</sup>	S.D. <sup>c</sup>	Mean <sup>b</sup>	S.D. <sup>c</sup>
Seeing litter along the river	3.2	1.4	3.6	1.3	3.3	1.4	2.9	1.3
Noticing the impact of human use on the soils, vegetation, or other natural features of the area	2.6	1.2	2.9	1.3	2.9	1.2	2.5	1.2
Being near large groups of people	2.2	1.3	2.3	1.3	2.3	1.3	2.2	1.3
Being near loud, noisy people	2.1	1.3	2.1	1.3	2.2	1.4	2.2	1.3
Encountering other people too frequently in the area	1.8	1.0	2.2	1.2	2.1	1.1	1.8	1.1
Seeing many other people using the area	1.9	1.1	2.1	1.2	2.0	1.1	1.7	1.0
Seeing brightly colored equip- ment of other users	1.4	0.8	1.7	1.1	1.4	0.7	1.4	0.7
Being near considerate, respectful people	1.6	1.1	1.6	1.1	1.4	0.9	1.5	1.1

<sup>a</sup>Calculations for each social item are based on at least the number of respondents indicated by N.

<sup>b</sup>Means are based on responses to a five-point response format ranging from 5 (Extreme problem) to 1 (Not at all a problem).

<sup>c</sup>Standard deviation (S.D.) is a measure of variation in the responses around the mean.

Table D-2. Environmental feature preference scale (S) and item (I) means and standard deviations for respondents sampled in the Arkansas River study area (Summer, 1978).

Environmental Feature Preferences					
Scale Item	Mean <sup>b</sup> S	I	Standard Deviation <sup>c</sup>	Number of Respondents	Alpha <sup>d</sup>
Clean, Fresh Air	3.6		1.0	545	
Clean, fresh air		3.6	1.0	545	
Panoramic Views	3.0		1.2	534	
Panoramic views		3.0	1.2	534	
Vegetation	2.8		1.3	513	.70
Wildflowers		2.9	1.2	530	
Mix of trees, shrubs, and smaller vegetation		2.7	1.3	532	
Attractive Topography	2.7		1.4	544	.85
Steep hillsides		2.5	1.5	524	
Rock outcrops		2.7	1.3	537	
Colored rock formations		3.1	1.1	538	
Unusually shaped rocks		2.7	1.5	541	
Rugged terrain		2.8	1.4	500	
Wildlife	2.7		1.4	538	.80
Bighorn sheep		2.9	1.3	528	
Deer		3.2	1.2	543	
Birds of prey		1.9	1.8	510	
Small mammals		2.8	1.4	514	
Variety of birds		2.6	1.4	514	
Rapids	2.6		1.5	494	
Fast and churning rapids		2.6	1.5	494	
Fishing	2.5		1.6	505	
Fishing opportunities		2.5	1.6	505	
Historic features	2.0		1.8	536	.61
Historic landmarks		2.1	1.8	524	
Old mining claims		2.1	1.7	523	
Old cabins		1.9	1.8	528	
Bridges	1.0		2.0	532	
Bridges		1.0	2.0	532	
Livestock	0.6		2.1	523	
Grazing livestock		0.6	2.1	523	
Slow-Moving Water	0.6		1.9	524	
Slow moving water		0.6	1.9	524	
Navigational Problems	-0.2		1.8	418	.68
Navigational problems due to low water		-0.4	1.7	439	
Navigational problems due to high water		-0.1	1.8	449	
Nuisance Factors	-0.5		2.1	538	.70
Boggy areas		-0.2	2.0	512	
Rock slides		-0.4	2.2	529	
Unpredictable weather		0.2	2.0	502	
Muddy water		-1.5	2.1	509	
Man-Made Intrusions	-1.1		2.2	530	.68
Power lines		-1.8	2.0	513	
Fences		-1.1	1.9	524	
Resort development		-0.7	2.7	525	
Pollution	-3.3		1.8	525	.77
Litter and trash		-3.3	1.8	536	
Water pollution		-3.3	1.8	535	

<sup>a</sup>Two items from the questionnaire, (1) sandy beaches, and (2) steep river banks, were not included in this analysis.

<sup>b</sup>Means are based on responses to a nine-point response format ranging from +4 (most strongly adds) to -4 (most strongly detracts).

<sup>c</sup>Standard deviations for multiple-item scales are computed by averaging the standard deviations of the items within that scale.

<sup>d</sup>Alpha reliability for scales containing more than one item using the Cronbach alpha computation for internal consistency.

Table D-3. Environmental feature preference scale means and standard deviations for respondents sampled in the Arkansas River study area, grouped by most important activity (Summer, 1978).

Environmental Feature Preference Scales <sup>a</sup>	Most Important Activity Groups							
	Camping (N=74) <sup>b</sup>		Fishing (N=76) <sup>b</sup>		River Running (N=43) <sup>b</sup>		Sightseeing/ Auto Driving (N=96) <sup>b</sup>	
	Mean <sup>c</sup>	S.D. <sup>d</sup>	Mean <sup>c</sup>	S.D. <sup>d</sup>	Mean <sup>c</sup>	S.D. <sup>d</sup>	Mean <sup>c</sup>	S.D. <sup>d</sup>
Clean, Fresh Air*	3.6	0.9	3.5	1.2	3.8	0.4	3.6	0.8
Panoramic Views*	3.0	1.2	2.6	1.4	3.1	1.1	3.2	1.0
Vegetation	2.9	1.2	2.5	1.4	2.8	1.2	2.8	1.3
Attractive Topography	2.7	1.3	2.5	1.6	2.8	1.2	2.8	1.3
Wildlife	2.6	1.4	2.8	1.5	2.9	1.3	2.5	1.4
Rapids*	2.6	1.4	2.3	1.7	3.1	1.3	2.6	1.5
Fishing*	2.5	1.5	3.5	1.2	1.7	1.9	2.2	1.6
Historic Features	2.3	1.4	1.6	1.9	1.7	1.9	2.0	1.7
Bridges*	1.4	1.5	0.7	2.3	-0.4	2.0	1.2	1.7
Livestock*	0.9	1.9	0.4	2.4	0.7	2.0	0.6	1.8
Slow-Moving Water*	0.3	1.8	1.1	2.1	-0.2	1.8	0.5	1.7
Navigational Problems	-0.3	1.4	0.0	1.7	-0.2	2.2	-0.3	1.7
Nuisance Factors	-0.6	2.0	-0.5	2.0	-0.2	2.1	-0.7	2.0
Man-Made Intrusions	-0.8	2.1	-1.7	2.1	-2.2	1.8	-0.8	2.1
Pollution	-3.6	1.0	-3.3	1.9	-3.7	0.9	-3.2	2.0

<sup>a</sup>Scales with an asterisk (\*) are single-item scales. All other scales are composed of two or more closely related environmental feature preference items. Refer to Appendix D, Table D-2 for more details.

<sup>b</sup>Calculations for each environmental preference scale are based on the number of respondents indicated by N.

<sup>c</sup>Means are based on responses to a nine-point response format ranging from +4 (most strongly adds) to -4 (most strongly detracts).

<sup>d</sup>Standard deviations for multiple-item scales are computed by averaging the standard deviations of the items within that scale.

APPENDIX E

ARKANSAS RIVER RECREATION USE DATA

## Introduction

During FY78 the Bureau of Land Management (BLM) provided research funds for implementing Objective 2 of the Revised Research Proposal of July, 1976 to "develop a procedure using field observation and on-site surveys, including traffic counters and road stops, to quantify outdoor recreationists' preferences at areas used intensively for dispersed recreation." A survey procedure (exit interview) was implemented during the summer of 1978 along the Arkansas River between Canon City and Salida in Colorado to obtain data for recreation use estimates and initiate the research effort designed to quantify the experience preferences of recreationists visiting that area. This report summarizes the results of the analyses performed on data gathered during the exit interview procedure.

## Exit Interview Procedures

A roadside traffic-stop interview procedure was designed using a short one-page questionnaire<sup>1</sup> to collect recreation use information and names and addresses from recreationists leaving the Arkansas River Study Area (ARSA). This procedure was implemented during a 100-day sampling period from May 27, 1978 to September 3, 1978. A total of 4,952 interviews were conducted of which 1,905 or 22 percent were interviews where the respondent indicated that he/she had been participating in a recreation activity in the ARSA. Respondents for the roadside interviews were selected randomly from the total traffic passing the interview station. Therefore, the total number of vehicles eligible for the survey was determined by subtracting the

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<sup>1</sup>Exhibit A, Figure A-1.

number of commercial vehicles from the total number of vehicles passing the interview station. Inductive loop traffic counters were installed near the interview stations to determine the total vehicular traffic volumes exiting the study area during the summer sampling period. Estimates of the number of total summer vehicles eligible for the survey and the number of total summer recreation vehicles were calculated using the proportions of these traffic types observed and recorded during the sampled days. Table 1 shows by interview station a breakdown of the number of interview days, total interviews, recreation interviews, total summer vehicles, estimated total summer vehicles eligible for the survey, and the estimated total summer recreation vehicles.

#### Sample Summary Statistics

The sample data collected during the roadside survey were coded, key-punched on computer cards, and verified during September of 1978. Utilizing the Statistical Package for the Social Sciences (SPSS) computer programs, the recreation use data was summarized producing frequency tables by activity and zone of use for the 1,095 recreation interviews (see Figure 1 for the zone locations in the main study area). Column 1 of Table 2 shows the total number of respondents who participated in each listed activity anywhere in the Study Area. Columns 2, 3, and 4 show the activity breakdown for the respondents who recreated in each zone in the study area. Since a respondent may have participated in one activity in more than one zone, the sum total across all zones may be larger than the total figure recorded in column 1. Also, many respondents participated in more than one activity during their recreation visit. Sightseeing was the activity mentioned most often followed by camping near the automobile, fishing, hiking/walking,



Table 1. General data for interview stations for the Arkansas River Study Area.

Station	# of Sampled Days	Total # of Interviews <sup>a</sup>	Total # of Recreation Interviews <sup>b</sup>	Total Vehicles	Estimated Total Vehicles Eligible for the Sample	Estimated Total Recreation Vehicles
Parkdale	20	2,359	586	180,774	169,274	45,051
Salida	19	2,118	406	189,819	176,853	33,004
Hillside	<u>9</u>	<u>475</u>	<u>96</u>	<u>17,948</u>	<u>16,796</u>	<u>3,437</u>
Total	48	4,952	1,088	388,541	362,923	81,492

<sup>a</sup>These interviews show all vehicles stopped whether or not recreation was a part of the trip plan.  
N = 100-day sampling period (May 27 - September 3).

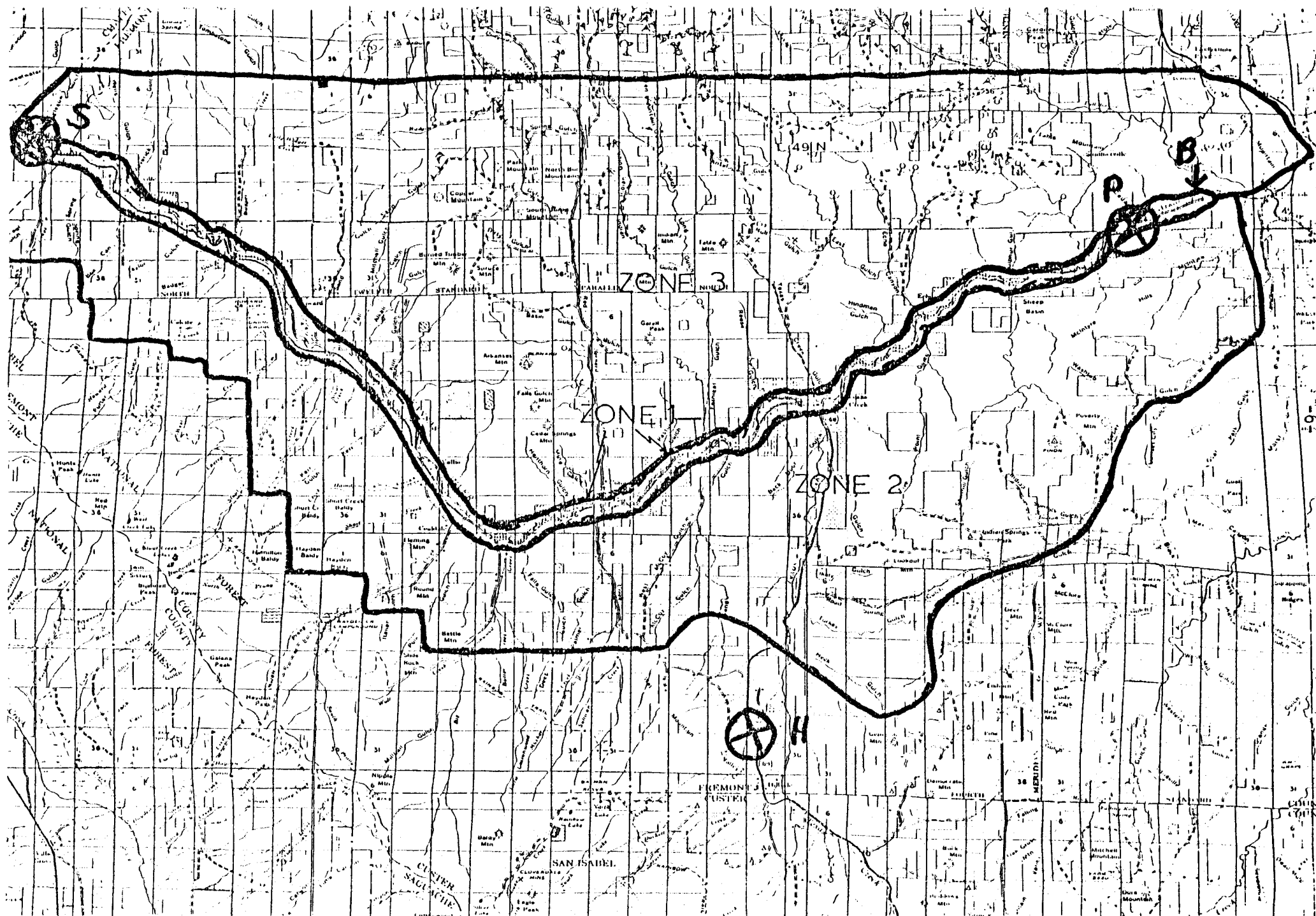
<sup>b</sup>A total of 1,095 recreation interviews were recorded. Seven interviews were recorded with either the station, date, or hours of recreation blank.

Table 2. Recreation participation by activity and zone for the Arkansas River Study Area.

Activity	Total Study Area		Total Zone 1		Total Zone 2		Total Zone 3	
	Number	Percent <sup>a</sup>	Number	Percent <sup>a</sup>	Number	Percent <sup>a</sup>	Number	Percent <sup>a</sup>
Camping near auto	346	32	233	21	101	09	18	02
Camping away from auto	17	02	10	01	7	01	1	00
Picnicking	206	19	166	15	34	03	11	01
Sightseeing/Auto driving	676	62	653	60	97	09	13	01
4-wheel driving	18	02	6	01	10	01	2	00
Motorcycling	17	02	12	01	3	00	2	00
Bicycling	11	01	8	01	3	00	-	
Collecting	77	07	60	05	17	02	11	01
Hiking/Walking	209	19	133	12	71	06	17	02
Horseback riding	17	02	3	00	13	01	2	00
Fishing	237	22	218	20	18	02	2	00
Mountain Climbing	2	00	1	00	-		1	00
Hunting	-		-		-		-	
Nature study	19	02	8	01	13	01	5	00
Photography	190	17	153	14	40	04	11	01
Wildlife viewing	24	02	15	01	9	01	3	00
Watching races	8	01	8	01	-		-	
Sunbathing	29	03	14	01	14	01	2	00
Competing races	2	00	2	00	-		-	
Tubing	4	00	3	00	1	00	-	
Kayaking	7	01	7	01	-		-	
Boating	1	00	-		1	00	-	
Swimming	48	04	22	02	23	02	3	00
Rafting	71	06	70	06	1	00	-	
Visiting	27	02	14	01	8	01	5	00
Other	52	05	29	03	13	01	10	01

<sup>a</sup>Percentages were calculated using the total number of recreation interviews (1,095) in the denominator.

Figure I. Arkansas River Study Area.



picnicking, etc. In zones 2 and 3, away from the river, camping was the predominant activity followed by sightseeing in zone 2 and hiking/walking in zone 3. Sightseeing may be underestimated for all zones, since a respondent participating in this activity in one zone can view an area in another zone without leaving the first zone. Therefore, the data shown in each zone should be interpreted as the number of respondents who participated in the indicated activity while physically in that zone.

Respondents were asked to indicate which one activity represented the most important reason for visiting the ARSA. Table 3 summarizes the responses to this question. Sightseeing/auto driving was the most important reason for visiting this area to almost half the respondents who answered this question. Camping near the vehicle and fishing also were indicated as important activities by the users.

Table 4 shows a breakdown of the number of visits the respondents had made to the study area in the past twelve months. Most of the people visiting the area indicated that this was their first visit in at least the last twelve months.

Tables 5 and 6 describe the recreation users sampled during the summer interviews. Each table is formulated using all the occupants in the vehicle as part of the sample. Table 5 delineates responses to the question, "What is the composition of your recreation party (group)?" Most respondents were recreating with their families. Table 6 was developed from interviewer observations concerning the estimated ages of the male and female occupants of each vehicle. These estimates indicate there was a slightly higher number of males visiting the area than females. Also, the middle two age groups contained the largest number of visitors.

Table 3. Most important activity for users of Arkansas River Study Area  
(N = 1,091).<sup>a</sup>

Activity	Number	Percent <sup>b</sup>
Camping near auto	235	22
Camping away from auto	9	1
Picnicking	24	2
Sightseeing/Auto driving	520	48
4-wheel driving	2	0
Motorcycling	9	1
Bicycling	1	0
Collecting	14	1
Hiking/Walking	6	1
Horseback riding	1	0
Fishing	129	12
Mountain climbing	1	0
Nature study	3	0
Photography	8	1
Wildlife viewing	1	0
Watching races	3	0
Competing races	1	0
Tubing	2	0
Kayaking	5	1
Rafting	56	5
Visiting/Other	59	5

<sup>a</sup> Activities which were not listed as a most important activity by any of the respondents were not included in this table.

<sup>b</sup> Percentages were calculated with respect to the total number of respondents answering this question.

Table 4. Previous visits to the Arkansas River Study Area in the last 12 months (N = 1,095).

Visits	Number of Respondents	Percent <sup>a</sup>
0	663	61
1-3	222	20
4-6	81	7
7-9	13	1
10-20	56	5
21-99	60	6
Never before <sup>b</sup>	287	26

<sup>a</sup>Percentages were calculated using the number of respondents answering this question.

<sup>b</sup>Of those respondents who indicated they had not visited the area in the last 12 months, 286 of the 663 had never been there before. That is, 36 percent of the recreationists interviewed had never been to the area before. These respondents are also included in the "0 visits" category.

Table 5. Composition of the recreation group with which the respondent was visiting the Arkansas River Study Area (N = 1,084).

Type of Group	Number of Respondents	Percent <sup>a</sup>
Family	778	72
Friends	121	11
Family and Friends	89	8
Organized Group	3	0
Alone	93	9

<sup>a</sup>Percentages calculated using the number of respondents answering this question.

Table 6. Group composition from all vehicles by age and sex for Arkansas River Study Area (N = 1,074).<sup>a</sup>

Age	Sex	Number of Respondents	Percent <sup>b</sup>
Under 16	Male	191	9
	Female	158	7
16-20	Male	57	3
	Female	38	2
21-35	Male	346	16
	Female	312	14
36-55	Male	359	16
	Female	354	15
56 and Over	Male	205	9
	Female	200	9

<sup>a</sup>The average number of occupants in each vehicle was 2.96.

<sup>b</sup>Percentages were calculated using the total number of people whose ages were estimated, 2,220.

The type of vehicle driven by the respondent and the type of trailer towed, if applicable, are shown in Tables 7 and 8. Fifty percent of the vehicles stopped were passenger cars, while most of the 112 trailers encountered were camper trailers.

Table 7.. Vehicle type for Arkansas River Study Area (N = 1,066).

Vehicle	Number of Observations	Percent <sup>a</sup>
Car	518	49
Truck	160	15
Van	79	7
Camper	115	11
Motorhome	95	9
Motorcycle	32	3
4-wheel Drive	62	6
Other	5	0

<sup>a</sup>Percentages were calculated using the total number of respondents answering this question.

Table 8. Trailer type for Arkansas River Study Area (N = 112).

Trailer	Number of Observation	Percent <sup>a</sup>
Utility	12	11
Camper	100	89

<sup>a</sup>Percentages were calculated using the total number of respondents answering this question.

If the respondents mentioned kayaking, boating, or rafting as recreation activities, the interviewer wrote down the put in and take out points on the interview form. The exact locations of the entrance and exit points could not be keypunched on computer cards, so seven locations were used to describe the general access spots. Each location in Table 9 represents an area approximately three to five miles upstream and downstream from the specific



location on the map. We recorded a total of 64 river floaters who put in, while only 63 took out. We assume the extra river user made it off the river, but have no record of where this occurred.

Table 9. Entrance and exit points for Arkansas River floaters.

Put in (N = 64)	Number of Respondents	Percent <sup>a</sup>
Cotopaxi	8	13
Texas Creek	13	20
5 - points	15	23
Coaldale	7	11
Howard	7	11
Salida	14	22
<hr/>		
Take Out (N = 63)	Number of Respondents	Percent <sup>a</sup>
Cotopaxi	8	13
Texas Creek	6	10
5 - points	21	33
Coaldale	2	3
Howard	6	10
Bridge	20	32

<sup>a</sup>Percentages were calculated using the total number of river floaters putting in or taking out respectively.

#### Estimates of Total Recreation Participation

Estimates of the total hours of recreation use and the average (mean) hours of recreation use for the entire sampling period were calculated using information collected from the roadside interview. Each respondent was asked how many hours he/she had spent recreating in the study area. This information was multiplied times the number of occupants in the vehicle to determine the total hours of recreation per vehicle. (Hereafter, total hours of recreation refers to the total hours for all the occupants of a vehicle as calculated above.) To do this we have assumed that all the

people in the vehicle were in the area the same amount of time as the respondent and they were participating in a recreation activity during that time. Table 10 presents this information in two forms for each interview station across the summer sampling period. Using data collected during each sample day, the mean number of total hours of recreation for each recreation vehicle (a vehicle in which the respondent indicated he/she had recreated in the ARSA) was determined. This information was used to calculate the mean number of hours of total recreation per vehicle for each station for all the sample days in the summer. This figure is shown in Table 10 under the recreation column for each station. The total column describes the mean number of total hours of recreation for all vehicles eligible for the survey (refer to description of Table 1) for all sample days at each station. This figure includes a value of 0 hours of recreation for those vehicles where the respondent indicated he/she had not participated in any recreation in the ARSA. This distinction was made to indicate that (1) all vehicles exiting the study area were not necessarily recreation vehicles; and (2) 0 hours is a legitimate response when determining recreation use from traffic counter data. If the percentage of recreation vehicles on a highway is not known or varies considerably, an average number of total recreation hours per vehicle exiting an area can be calculated using total traffic estimates from a roadside counter. Note that the means for the total figures are smaller than the means for the recreation figures. This is due to the addition of the 0's incorporated into the total mean estimate for vehicles indicating no recreation participation.

Table 11 shows the recreation use statistics for the entire sample across all interview stations during the summer sampling period. Included in these figures are mean estimates for the recreation population and total

Table 10. Hours of recreation use by station per vehicle for the sample data from the Arkansas River Study Area.<sup>a</sup>

Station	Recreation <sup>b</sup>	Total <sup>c</sup>
Parkdale	70.6304	18.8013
Salida	69.1056	12.8955
Hillside	37.3304	7.6496

<sup>a</sup>All figures are on a per visit basis.

<sup>b</sup>Mean number of total hours of recreation per vehicle summed for all the occupants of the vehicle in which the respondent indicated recreation participation in the study area (i.e., only recreation interviews).

<sup>c</sup>Mean number of total hours of recreation per vehicle summed for all the occupants of the vehicle for all the interviews conducted (i.e., recreation and non-recreation interviews).

Table 11. Mean and total hours of recreation estimated across all stations for all vehicles exiting the Arkansas River Study Area.<sup>a</sup>

Estimate	Recreation Population <sup>a</sup>	Total Population <sup>b</sup>
Mean <sup>c</sup>	68.3062	15.4548
Total <sup>d</sup>	5,608,920	5,608,920

<sup>a</sup>Figures based on the total hours of recreation per vehicle summed for all the occupants of the vehicle in which the respondent indicated recreation participation in the study area (i.e., recreation interviews across all interview stations).

<sup>b</sup>Figures based on the total hours of recreation per vehicle summed for all the occupants of the vehicle for all the interviews conducted across all interview stations (i.e., recreation and non-recreation interviews).

<sup>c</sup>Mean number of hours of total recreation per vehicle per visit.

<sup>d</sup>Estimate of the total hours of recreation occurring in the study area during the sampling period (May 27, 1978 to September 3, 1978).

population as described in the preceding paragraph. In addition, the table shows estimates of the total hours of recreation participation. This figure was calculated using the estimated recreation traffic volume to adjust the sample data to include all vehicles exiting the study area during the summer sampling period. These figures should be interpreted as estimates of the total hours of recreation for all vehicles (excluding commercial vehicles) passing through the study area.

EXIT INTERVIEW FORM

EXHIBIT A

# Figure A-1. Exit Interview Form.

IDENT \_\_\_\_\_ 75-80

1 INTERVIEWER \_\_\_\_\_ 2 STUDY AREA \_\_\_\_\_ 3 STATION \_\_\_\_\_

4-6 DATE \_\_\_\_\_ 7 TIME OF WEEK: WEEKDAY (1) WEEKEND (2) HOLIDAY (3)

8 TRIP PURPOSE: REC (1) NON-REC (2) TO-FROM REC (3) 9 TRIP ORIGIN: WITHIN STUDY AREA (1) OUTSIDE AREA (2) OUTSIDE-COMMUTER (3)

10-12 TOTAL TIME SPENT IN AREA \_\_\_\_\_ HOURS

TIME SPENT IN EACH ZONE (HRS.):

1 2 3 4 5

13-15 16-18 19-21 22-24 25-27

ACTIVITY	ZONES	TOTAL HOURS	ACTIVITY	ZONES	TOTAL HOURS
1) CAMPING NEAR AUTO 31-33		28-30	14) NATURE STUDY 70-72 73-74 (02)		67-69
2) CAMPING AWAY FROM AUTO 34-36		31-33	15) PHOTOGRAPHY 10. 75-80 C3: 1-3		70-72 73-74 (01)
3) PICNICKING 37-39		34-36	16) WILDLIFE VIEWING 4-6		10. 75-80 C2: 1-3
4) SIGHTSEEING-AUTO DRIVING 40-42		37-39	17) WATCHING RACES 7-9		4-6
5) 4-WHEEL DRIVING 43-45		40-42	18) SUNBATHING 10-12		7-9
6) MOTORCYCLING 46-48		43-45	19) COMPETING - RACES 13-15		10-12
7) BICYCLING 49-51		46-48	20) TUBING 16-18		13-15
8) COLLECTING 52-54		49-51	21) KAYAKING 19-21		16-18
9) HIKING/WALKING 55-57		52-54	22) BOATING 22-24		19-21
10) HORSEBACK RIDING 58-60		55-57	23) SWIMMING 25-27		22-24
11) FISHING 61-63		58-60	24) RAFTING 28-30		25-27
12) TECHNICAL MT. CLIMBING 64-66		61-63	25) OTHER 31-33		28-30
13) HUNTING 67-69		64-66			

34-35 WHICH ACTIVITY WAS MOST IMPORTANT TO YOU AS A REASON FOR VISITING THIS AREA? (ABOVE #) \_\_\_\_\_

36-37 PREVIOUS VISITS TO THE AREA WITHIN THE PAST 12 MONTHS? # \_\_\_\_\_

38 IF 0; HAVE YOU EVER BEEN HERE BEFORE? YES (1) NO (2)

39 GROUP COMPOSITION: FAMILY (1) FRIENDS (2) FAMILY & FRIENDS (3) ORGANIZED GROUP (4) ALONE (5)

40-41 RIVER USE: (IF ACTIVITY #21, 22, OR 24 CHECKED) 40 PUT IN \_\_\_\_\_ 41 TAKE OUT \_\_\_\_\_

ADDRESS OF PERMANENT RESIDENCE:

C4: 1 (1), 2-29 NAME \_\_\_\_\_ 73-74 (04), 10. 75-80

C5: 2-35 STREET ADDRESS \_\_\_\_\_ 73-74 (05), 10. 75-80

C6: 2-30 CITY, STATE \_\_\_\_\_ 31-35 ZIP \_\_\_\_\_ 73-74 (06), 10. 75-80

42 TYPE OF VEHICLE: CAR (1) TRUCK (2) VAN (3) CAMPER (4) MOTORHOME (5) MOTORCYCLE (6) 4-WHEEL DRIVE (7) OTHER (8)

43 TRAILER TYPE: UTILITY TRAILER (1) CAMPER TRAILER (2)

44-45 TOTAL # OF PEOPLE IN VEHICLE \_\_\_\_\_

-15		16-20		21-35		36-55		+55		CARS PASSED
M	F	M	F	M	F	M	F	M	F	
46	47	48	49	50	51	52	53	54	55	56 57

58-59 TOTAL # OF ADDRESSES \_\_\_\_\_

60-61 TIME OF DAY \_\_\_\_\_

73-74 (03)

75-80 IDENT

\*\* SMILE \*\*

## APPENDIX F

### GRAB SAMPLE RESULTS

## GRAB SAMPLE RESULTS

In the fieldwork planning stages of the Arkansas River research, BLM personnel indicated that two areas outside the designated study area received concentrated use by river recreationists. "Grab sampling"<sup>1</sup> was initiated at these areas, Ruby Mountain and Heckla Junction (Figure 2), to determine if river users there have different preferences for recreation experiences than river recreationists in the main study area. The primary focus was on users engaging in river running (kayakers, tubers, rafters). Using the exit interview form (Appendix A, Figure A-1) at the two on-site locations, interviewers asked river users for their names and addresses and cooperation regarding participation in a mail questionnaire survey. Interviewers attempted to contact as many users as possible during the designated sampling times at each grab sample area.

Questionnaires identical to those mailed to the main study area sample (Appendix A, Figure A-2) were sent to the grab sample recreationists. Twenty-four river runners from the Ruby Mountain and Heckla Junction areas returned completed questionnaires. Analyses of these data focused on comparing the responses of the grab sample river runners to responses of the river runners using the main study area. Results indicate that: (1) no significant differences were found between the river runner samples regarding their age,

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<sup>1</sup>Grab sampling should be considered a fortuitous or convenience sampling technique which might or might not produce a representative sample. The primary purpose was to acquire user preference information from test areas where managers had little or no information about user preferences, and where budget constraints and research objectives did not allow the intensive sampling necessary to insure that the sample was representative of the population.



sex, education, city size (population), social condition preferences, or management action preferences; and (2) very few differences between the river runner samples were identified in the analyses of the recreation experience preferences and environmental feature preferences.

Only two of the 37 REP scales show differences between the means of the grab sample area river runners and river runners using the main study area (Table F-1). The main study area river runners scored higher on the Exercise/Physical Fitness dimensions and lower on the Escaping Family dimensions than the grab sample area river runners. While these differences are statistically significant, it is difficult to draw conclusions about experience preference differences between users of the two areas without more support from the other REP dimensions.<sup>2</sup>

Similarly, the analyses of the environmental feature preference scales identified very few differences between the means of the two samples of river runners (Table F-2). Panoramic Views, Vegetation, and Wildlife all added more to the perceived satisfaction of the river runners from the main study area than to that of the grab sample area users. River runners in the main study area corridor appeared to be more interested in the environment around the river than were the river runners in the grab sample areas.

Overall, the REP and environmental feature differences discussed above, coupled with the analyses of the other variables, indicate that the characteristics and preferences of river runners from the grab sample and main study areas are extremely similar.

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<sup>2</sup>From a statistical standpoint, one might expect differences on one or two of the REP dimensions to occur by chance alone when differences are analyzed on 37 scales.

Table F-1. Recreation experience preference scales showing significant differences between the means of Arkansas River study area river runners and Heckla/Ruby "grab" sample river runners (Summer, 1978).<sup>a</sup>

Recreation Experience Preferences Domain Scale	Arkansas River Study Area River Runners (N=38) <sup>b</sup> Scale Mean <sup>c</sup>	Heckla/Ruby "Grab" Sample River Runners (N=21) <sup>b</sup> Scale Mean <sup>c</sup>
Exercise/Physical Fitness Exercise/Physical Fitness	3.0	2.2
Escaping Family Escaping Family	0.0	1.2

<sup>a</sup>Significant differences are based on a Student's t-test ( $p \leq .05$ ).

<sup>b</sup>Calculations for each scale are based on at least the number of respondents indicated by N.

<sup>c</sup>Means are based on responses to a nine-point response format ranging from +4 (most strongly adds) to -4 (most strongly detracts).

Table F-2. Environmental feature preference scales showing significant differences between the means of Arkansas River study area river runners and Heckla/Ruby "grab" sample river runners (Summer, 1978).<sup>a</sup>

Environmental Feature Preference Scales <sup>b</sup>	Arkansas River Study Area River Runners (N=46) <sup>c</sup> Mean <sup>d</sup>	Heckla/Ruby "Grab" Sample River Runners (N=21) <sup>c</sup> Mean <sup>d</sup>
Panoramic Views*	3.1	2.4
Vegetation	2.8	2.0
Wildlife	2.9	2.4

<sup>a</sup>Significant differences are based on a Student's t-test ( $p \leq .05$ ).

<sup>b</sup>Scales with an asterisk (\*) are single-item scales. All other scales are composed of two or more closely related environmental feature preference items. Refer to Appendix D, Table D-2 for more details.

<sup>c</sup>Calculations for each scale are based on at least the number of respondents indicated by N.

<sup>d</sup>Means are based on responses to a nine-point response format ranging from +4 (most strongly adds) to -4 (most strongly detracts).

*New Mexico - Monthly  
Climatological Data*

*'77, '78, '79*